DOCUMENT RESUME

ED 353 149 SE 053 156

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TITLE Magnets. A Language Development Unit for Science. Matter and Energy. Grade Two.
INSTITUTION Northwest Territories Dept. of Education, Yellowknife.
PUB DATE 88
NOTE 104p.; For other documents in this series, see SE 053 148-150, SE 053 153, SE 053 157-158, SE 053 160-161, and SE 053 163-164; for the overview of this program, see SE 053 072.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Childrens Literature; Concept Formation; Curriculum Guides; *Elementary School Science; English (Second Language); English Instruction; Foreign Countries; *Fused Curriculum; Grade 2; Integrated Curriculum; *Language Arts; *Language Skills; Learning Activities; *Magnets; Mathematics Instruction; Primary Education; Process Education; *Science Instruction; Social Studies; Units of Study
IDENTIFIERS Northwest Territories

ABSTRACT

One of the basic principles of the Language Development Approach is that students must learn the language necessary to understand, talk, and write about all subject areas in order to succeed in school. This book contains information about teaching primary school science in the Northwest Territories with lessons that emphasize language. The goals of the unit are to (1) develop student language proficiency; (2) provide opportunities for students to use language in many different situations and for many different purposes; (3) develop student listening, speaking, reading, writing, and thinking skills including the science process skills; and (4) expand student knowledge of the science concepts related to magnets. Following a section on resources (background information on magnets, resources included with this unit--various pictures of bears, and related English materials--magazines, lists of children's books about magnets, teacher's resources, films, etc.), lesson plans on two topics (properties of solids and magnets) are presented. Activity ideas for science/social studies, mathematics, language arts, music/poems/stories, art, physical education/movement, and special activities are suggested. Each lesson plan contains the following segments--exercises or activities: science concepts, English vocabulary, English sentence patterns, English language concepts, special materials required, concept development/language exposure, language practice, and application. Poems, songs, and stories on this subject conclude the guide. The lessons contained are appropriate for students whose first language is English as well as for students who are learning English as a second language.
(PR/CW)

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MAGNETS

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Magnets

A Language Development Unit for Science
Matter and Energy

Grade Two

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SCHOOL PROGRAMS
DEPARTMENT OF EDUCATION
NORTHWEST TERRITORIES
1988

FOREWORD

Parents, educators, and students themselves all recognize the importance of language in the school curriculum. In order to have appropriate language programming, students need to have their experiences, skills, knowledge, and particularly, the language they bring to school identified and used as the basis for the program. Language programs should begin with and build upon these strengths. Where a child is dominant in a language other than English, he should be taught in that language. In many communities in the N.W.T. that means that the language of instruction should be Inuktitut or one of the Dene languages. Students in these communities need to gradually learn English as a second language. In instances where students speak a dialect of English upon school entry, the school's role is to respect and make use of the language the students bring. The school program should also help those students extend their English proficiency by learning the language used in varied communication situations and the language necessary for success with the academic curriculum. The aim of language instruction, where applicable, and where possible, is to produce bilingual students.

Successful bilingual education requires good teaching in both languages. For many years northern educators have wrestled with the difficulties of teaching English with inappropriate commercial materials from the south. Teachers have been requesting assistance with how to most efficiently and effectively teach English as a second language/dialect. The Department of Education has determined that the Language Development Approach is the most suitable way to meet the needs of ESL/D students. The Department has developed these units for teachers to use in their classrooms and therefore expects teachers to implement these units unless they can identify and justify to their Superintendent something more appropriate for their students.

Eric Colbourne,
Assistant Deputy Minister,
School Programs.

ACKNOWLEDGEMENTS

Special acknowledgement is made to Wendy Stephenson who developed many of the activity ideas and the original poems, songs and stories upon which this unit is based.

A special note of thanks to Soledad Boado-Castillo for her patience and diligence in typing and retyping the unit.

Bonnie Pugh and Cathy McGregor adapted Jim MacDiarmid's Language Development framework which forms the structure for each lesson.

Refining the format of and brainstorming activity ideas for the Language Development units involved the assistance of many northern educators. Members of the Teacher Committee who helped develop and pilot sample units included:

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LANGUAGE DEVELOPMENT/SCIENCE UNITS

SCIENCE THEME	GRADE/YEAR		
	1	2	3
LIFE AND THE ENVIRONMENT*	- - - - - - - - LIVING/NON-LIVING THINGS - - - - - - - -		
	Arctic/Sub-Arctic Land Animals	Birds	Marine Mammals (Whales)
	- - - - - - - - - - - - - - - - PLANTS -		
	- - - - - - - - - - - - - - - POPULATIONS - - - - - - - - - - - - - - - -		
	Bears/ Polar Bears	Dinosaurs	Fish
MATTER AND ENERGY	Popcorn	**Magnets**	Water
	- - - - - - ENERGY and ENERGY CONSERVATION - - - - - -		
EARTH, SPACE AND TIME **	- - - - - - - - - - SUN, MOON AND SHADOWS - - - - - - - - - -		
	- - - - - - - - - - AIR AND AIR PRESSURE - - - - - - - - - - - - -		

* Other animals are covered under Social Studies topics: Fall, Winter and Spring.

Moose/Caribou
Beaver/Muskrat
Rabbit
Seals
Other fur-bearing animals

** Weather will be covered in a Science/Social Studies/Math unit.

UNIT OVERVIEW MAGNETS

Topic A - Properties of Solids

1. How do solids differ?

   a) Solids can differ in colour, size, shape, mass and hardness. (Review of Grade One concepts - see POPCORN unit.)
   b) Some solids are metals; some are not.
   c) Some solids are attracted by magnets; some are not.

2. How can changes occur in the properties of solids?

   a) Some solids can be magnetized.
   b) Some solids can be demagnetized.

Topic B - Magnets

1. What types of magnets are there?

   a) bar magnets
   b) U-magnets
   c) horseshoe magnets
   d) rod-shaped (cylindrical) magnets
   e) ring magnets
   d) disc magnets

2. What are the properties of a magnet?

   a) Every magnet has two poles.
   b) Like poles repel; unlide poles attract.
   c) Around every magnet there exists a magnetic field.
   d) The magnetic field is strongest at the poles.
   e) A magnetic field can pass through some materials and not others.

3. How can magnets be used?

   a) Magnets can be used to hold things together.
   b) Magnets can separate mixtures of materials if some of them attract magnets.
   c) Magnets can be used as compasses.
   d) Magnets can be used in machines.

This chart has several purposes:

1) It translates general concepts from the program guide into specific concepts related to this particular theme.

2) It outlines additional concepts necessary to develop the theme.

3) It integrates and organizes all the concepts into "teachable" topics and a "teachable" unit.

HOW TO TEACH THE "MAGNETS" UNIT

How does the topic "Magnets" relate to the science program?

The Elementary Science Program (1-3 and 4-6, 1986) contains several themes which include concepts related to magnets. The following chart shows how the topics outlined on the General Concepts/Unit Overview sheet (see Table of Contents for page number) and the lessons in this unit relate to the concepts suggested in the program guide.

Primary Science Guide	Unit
1.3 Properties of Materials and Change	
2. Objects (solids) can be distinguished by physical properties such as colour, size, mass and shape.	Lesson: Properties of Metals
3. Objects (solids) differ in their texture, hardness and relative weight.	See Popcorn Unit (review)
4. Change occurs where the properties of objects (matter) are modified.	See Popcorn Unit (review)
5. Changes in properties of objects (solids) can occur when the objects are heated or cooled.	See Popcorn Unit (review)
2.2 Properties of Matter	
1. Objects are made of materials which have unique properties.	
4. Some solids can be classified as metals on the basis of specific properties, e.g. - shininess - flexibility (bends) - can be beaten flat by hammering (malleability)	Lesson: Properties of Metals
3.3 Changes in Matter	
10. Mixtures of materials can be separated on the basis of unique properties: a) Solids - some solids are attracted magnets	Lesson: Some Solids Are Magnetic, Some Are Not

Using the topic "Magnets" as an organizing theme, this unit translates the concepts from the Science and Social Studies program guides into a set of teaching lessons.

What part of my program is this unit?

One of the basic principles of the Language Development Approach is that students must learn the language necessary to understand, talk and write about all subject areas in order to succeed in school. Most of the material in the "Magnets" unit is related primarily to Science; it is therefore part of your Science program. It also contains lessons which emphasize language and concepts from other subject area. At the beginning of each lesson is a statement which indicates which subject area that lesson emphasizes. You can teach the Literature lessons during Language Arts periods or during Science, whichever you prefer.

What are the goals of this unit?

The goals of this unit include:

- developing students' language proficiency. The purpose is to increase their storehouse of language items and meanings (vocabulary) and to build their intuitive knowledge of structures (sentence patterns). The intent is not to have students study how the language works or to analyze it.
- providing opportunities for students to use language in many different situations and for many different purposes.
- developing students' listening, speaking, reading, writing, and thinking skills. The thinking skills developed include the scientific process skills described in the science program guide.
- expanding students' knowledge of the science concepts related to the "Magnets" topic.

What grade level is this unit?

Schools throughout the N.W.T. have different ways of organizing students into classes. There are classrooms which consist of only one grade, while others combine two or even three grades. Small schools sometimes have to put primary and intermediate students together. Regardless of the grade level(s), students in each class will have a variety of levels of proficiency in English.

It is difficult to present a unit which teachers can use easily in all these different situations. The chart which outlines Science topics for grades one to three lists this unit under Grade Two. You will find, however, that the unit contains a variety of language items, sentence patterns and activity ideas. Some of the concepts and some of the language activities in the lessons are more suitable for younger/older students. This was done to accommodate the range of abilities which exist even in classes which are supposed to be one grade level and also for those teachers who have multi-grade classrooms and want to teach the same unit to the whole class.

What else do I need to know before I teach this unit?

It is important to understand the Language Development Approach which forms the basis of this unit and the Language Development Framework which forms the structure of each lesson. Please read the explanation of them which follows this section. It introduces the parts of each lesson and explains their purpose. Once you have read the description several times and taught a few lessons you probably will not have to read it for every unit.

How long should I spend on this unit?

The length of time you spend on each lesson and on the unit as a whole will depend in part upon what your students already know about the concept/topic and how interested they are in it. As with any unit you teach, however, the success of this unit will depend largely upon your interest in and enthusiasm about the topic. If you make the lessons stimulating to students, they will want to spend more time studying the topic.

In general, it is more important to cover a few concepts well and ensure that students incorporate the language items for those concepts into their language repertoires than to cover everything in the unit. If students begin to lose interest in the topic, wind up what you are doing and start a new unit.

Which lessons do I teach?

This unit includes a number of lessons. As the person who knows your students and their needs best, you must decide which lessons are appropriate for your students and which are not. You may decide not to teach certain lessons because:

- students already know the concept and the language covered
- students are not interested in that aspect of the topic
- the language is too difficult or is not appropriate
- the concepts are too difficult or are not appropriate

The initial assessment activities will help you identify which concepts and vocabulary students already know and therefore which lessons you can skip and which are more appropriate for you to teach. You might also want to check the students' cumulative files and/or discuss with other teachers which topics students have already covered. It is important to keep a record of which lessons you teach so that other teachers will not repeat that material in future years.

In what order should I teach the lessons?

You can teach the lessons in the order in which they appear in the unit or you can teach them in any order you think is appropriate for your students. Generally, the Science lesson for a topic should precede (or be taught at the same time as) the Language Arts lesson for that topic. The Language Arts lesson uses poetry or literature to reinforce the concepts taught during Science.

How do I adjust these lessons to meet the particular needs of my students?

The lessons in this unit are SAMPLE lessons. They may be used in classrooms where English is the first language of students (and they are very proficient), where students speak a dialect of English, or where English is a second language for students who come to school proficient in an aboriginal language. Because of this diversity of linguistic situations it is difficult to design lessons which are equally appropriate in every classroom. These lessons provide an example of the kind of language and activities which are appropriate to teach the concepts related to the topic. You may be able to teach them exactly as they appear here. If you feel some aspect of a lesson is not appropriate for your students however, feel free to adapt it to meet their needs. You may wish to use some of the activity ideas to make up lessons of your own and use them instead of the ones

included. Some of the most common ways in which you might need to adjust the lessons include changing the:

a) amount of type of vocabulary and/or sentence patterns in a lesson. During the initial assessment activity you may find that students have/don't have particular vocabulary items or sentence patterns. You may need to make the language in each lesson simpler or more difficult, depending upon your students' proficiency. You may want to introduce fewer or more vocabulary items or sentence patterns. Students who are more proficient need to concentrate on vocabulary; you may want to omit all sentence patterns for them.

b) number of listening and speaking activities. Students who speak little or no English or who are not familiar with a topic require extensive aural/oral practice. This is particularly true of primary ESL students. You may want to delete reading and writing activities altogether for such students and substitute more listening and speaking activities. Students who are having difficulty speaking need more listening practice so you may want to increase the emphasis on listening. Students who are more proficient do not need as much listening and speaking practice; they can do more reading and writing activities.

c) kinds of activities suggested for listening, speaking, reading, and writing. Your students' ages, interests, abilities, needs, and language proficiency influence the kinds of activities you choose for them. Students with limited proficiency require more controlled Language Practice activities. Students who are more proficient can handle more open-ended activities. Your preferred teaching style and the materials and equipment available to you also affect your planning. You may want to change some of the activities to make them more suitable for your students. You may have to change others because you do not have the necessary resources.

d) sequence of activities suggested. Each lesson contains all three phrases of the Language Development Framework: Concept Development/Language Exposure, Language Practice, and Application. It is important to include all three phases in your teaching. However, you may want to alter the sequence in which you do the activities within each phase. For example, in the Language Practice phase listening and speaking activities always precede reading and

writing activities. Usually it is important to develop aural/oral skills before introducing/developing literacy skills. However, if you have older students who are more proficient in reading and writing you may have to combine those activities with listening and speaking to keep students interested and involved. This is not as likely for primary students; they require simple physical actions to help focus their attention and energy during listening and speaking activities.

e) content used to teach the concept in each lesson. These units have been developed for use throughout the N.W.T. in various cultural and linguistic situations. It is difficult, therefore, to be as culturally specific in the lessons as desirable. As you plan your lessons, you must be as sensitive as possible to the cultural values, experiences, and lifestyles of your students. Please make the lessons as relevant to your community and your students as possible. If you think anything might be offensive to parents or students in your community please omit it or substitute more appropriate content. If in doubt, ask! LEA members, classroom assistants, and parents can provide suitable alternatives. If you are teaching any of the lessons in an aboriginal language, you probably will need to change much of the specific content in those lessons.

f) language in which you teach the lesson. If you teach in a classroom in which an aboriginal language is the language of instruction and English is taught as a second language you will want to teach some of the lessons in each language. For students who are just learning to speak English, the language in some of the lessons is too difficult. Teach those lessons in the aboriginal language.

If you teach in a classroom in which English is the language of instruction, you will teach all of the lessons in English. In such situations, you might teach some lessons during your Science periods and others during your Language Arts periods. If your students are not very proficient in English you may want to omit some lessons altogether.

How do I group students?

These lessons have been designed to that you can teach one lesson to the whole class. You can do Concept Development activities with everyone in most instances. Then you can group students for Language Practice activities according to their needs and abilities. Students who require listening and speaking practice can work with the teacher, a classroom assistant, a tape recorder, or a language master while other students do related reading and writing activities. In this way you can work with the whole class on the same lesson, but students can perform at their own individual skill levels.

Sometimes you may want to group students and teach each group a different lesson. You could organize these groups in two ways:

1) include students with different levels of proficiency in each group. The students who are more proficient serve as models for less proficient students. Teach each group a lesson from a different topic and have students share their work with each other.

2) include students with similar proficiency levels in each group. Teach each group a lesson using material at its proficiency level.

What kind of preparation do I need to do before teaching a lesson?

First of all, you should read over the lesson so that you are familiar with it and with the materials you require to teach the lesson.

Secondly, you should make sure you have all your materials ready, even if it means delaying the introduction of a unit or lesson for several days. This includes whatever resources you require for the Concept Development activities, as well as Language Practice materials: vocabulary cards, pictures, sentence strips, etc.

Initially, it may seem as if there is a lot of preparation for each lesson, but one lesson may take several days to teach and most lessons use the same materials over and over again in different ways. Students in small groups use many of the materials from Concept Development activities during Language Practice. If you work in a school where more than one teacher is using the units, perhaps you can share the preparation work required. Older students often enjoy making things like sentence strips after school as well. Once you have made the materials for one lesson, be sure to save them for another teacher or another year! Plastic envelopes have been provided to help you keep all the materials for one unit together.

How do I schedule a lesson on my timetable?

Because the lessons emphasize language related to different subject areas, you may want to teach them during various subject periods. This means you may be working on two or three lessons at the same time, each during a different subject. Since the lessons all focus on the same theme, language and concepts emphasized during one period will reinforce those learned during another. It also means that you would be combining the normal times allocated each week for Science and Social Studies to teach this Science unit for three weeks or a month. You would then switch to a Social Studies unit for several weeks using both time periods.

As you plan, keep in mind that one lesson is not necessarily equivalent to one day's work. You will require several days to cover most lessons. You need this amount of time to make certain students internalize new concepts and language items. The chart below shows how you might teach the lesson "Magnets" during your Science period over a week.

Note that the Concept Development activities are spread over several days. This helps reinforce both concepts and language and gives students who miss one day's lesson other opportunities to be exposed to the material. Note also that listening/speaking activities precede reading and writing so that students are very familiar with the language orally/aurally before they work with it in print.

Key

(L) = Listening activity
(S) = Speaking activity
(R) = Reading activity
(W) = Writing activity

LESSON: SOME SOLIDS ARE MAGNETIC; SOME ARE NOT

	Monday	Tuesday	Wednesday	Thursday	Friday
Concept Development/ Language Exposure	#1a)	#1b) #2			
Language Practice		#1 (L) #2 (L)	#3 (L) #4 (L) #5 (L/S) #6 (L/S)	#4 (L) #7 (S) #8 (S/R)	#9 (R/W)
Application	#3	#1			#2 #4

How do I evaluate student progress in this unit?

Initial Assessment

The initial assessment activities which you do with the students before any of the lessons will help you determine which concepts and language students already know and which they need to learn.

Ongoing Assessment

It is important to continue assessing students' success in mastering language items, skills and concepts throughout the unit. Each phase of the framework provides opportunities for assessment. During the Concept Development/Language Exposure activities you can informally assess students' understanding of new concepts through observation. Watch to see which students have difficulty matching new language items with the appropriate objects or meanings. It is important to ensure that all students understand new vocabulary and sentence patterns before starting Language Practice activities.

The nature of the Language Practice activities allows you to assess individual student performance of listening, speaking, reading, and writing skills. You can decide which activity to do next based on student performance in the previous activity. Those students who have difficulty with aural/oral activities require extensive practice before doing reading and writing.

The Application activities have been designed to give you an opportunity to determine how much of the language for that lesson students have learned. You can also determine whether students understand the language and concepts.

In addition to observing students during lesson activities, sometime during the course of the unit each student should have a personal conference with you to review work from various lessons. The one-to-one nature of this meeting allows you to determine more effectively:

1. specific weaknesses and strengths in listening, speaking, reading, writing skills,
2. comprehension of and proficiency using new language items,
3. topics and areas within a topic of particular interest to the student.
4. individual progress with the development of scientific process skills (thinking skills),
5. comprehension of science concepts included in the unit.

For the student this meeting serves as an important opportunity to articulate thoughts and feelings about the topic, share work with an interested adult, and identify future projects and directions. You can use the conference to take an in-depth look at one piece of independent reading/writing, to teach skill lessons needed to support and encourage student efforts, and to determine appropriate activities for future lessons.

Final Assessment

The culminating activities provide further informal assessment opportunities. During these activities students use all the concepts, skills and language they have learned throughout the unit. In addition, you may want to use your own assessment techniques or instruments to determine what students have learned. There are examples of simple evaluation activities at the end of the unit.

What kind of records should I keep for this unit?

You will want to keep records for yourself of individual student's progress and mastery of skills, concepts and language. These records can be a combination of anecdotal notes based on observations, check lists, formal or informal tests, taped samples of students' speech and reading, and samples of written work.

Students should also be responsible for keeping records of what they have accomplished. They can keep lists (poems they have learned, stories they have read, books they have written), journals, and their own samples of speech, reading and writing.

Finally, it is also important to keep a list for the next teacher of which topics you have taught and which concepts have been covered in those topics. Hopefully this will prevent those groans of "We did that last year," or even worse "We've done that every year since grade one!"

You will find more detailed information on evaluation and record keeping forms in the booklet Evaluation Guidelines for the Language Development/Science Units.

INTRODUCTION TO THE LANGUAGE DEVELOPMENT APPROACH

This unit consists of lessons which illustrate how to implement the Language Development Approach in the classroom. In order to use these lessons most effectively, it is important to be familiar with and understand:

a) the principles which form the basis of the approach, and
b) the methodological framework which provides the structure for the lessons and applies the principles to teaching practice.

The following is a brief explanation of the principles and the framework. For a more in-depth discussion of both, refer to the appropriate sections in the Language Development ESL/ESD guide.

PRINCIPLES?

The Language Development Approach draws on elements of many approaches to teaching second languages and English language arts and integrates these to form a broad set of principles regarding language teaching. These principles include:

1. *Students need to have their experiences, skills, knowledge, and particularly, the language they bring to school identified and used as the basis for the school language program.* The program should begin with and build on these strengths. Where children are dominant in a language other than English, they should be taught in that language. In many communities in the N.W.T., that means that the language of instruction should be Inuktitut or one of the Dene languages. Such students should gradually learn English as a second language. In instances where students speak a dialect of English upon school entry, the school's role is to respect and make use of the language the students bring, and help them learn the English used in other communication situations and which is necessary for success with the curriculum. The aim of language instruction, where applicable, and where possible, is to create bilingual students.

2. *Students need to learn to articulate for themselves and to communicate their thoughts, feelings, needs, opinions, and intentions for a variety of purposes in many different communication contexts. They need to be able to understand, learn from and respond to the communication of others.* This involves being able to:

   a) express and inquire about personal needs, desires, feelings;
   b) socialize;
   c) direct;
   *d) express and find out intellectual attitudes;
   *e) impart and seek factual information on past and present experiences;
   *f) reason logically;
   *g) predict;
   *h) project;
   *i) imagine.

   *Success in school depends largely upon the students' abilities to use language in these ways.

3. *ESL/ESD students need to spend more time learning to speak English than they do learning about English.* Until students have an extensive language repertoire, and can use language for a variety of purposes and in many different situations, they are not ready to analyze language. When students have developed an intuitive grasp of how English works, they can begin to study language concepts and how to apply them.

4. *Students need to learn language, but they also use language to learn.* Therefore, language should be taught across the curriculum. Whether students are learning a subject in their first language or in a second language, the development of each student's language skills is essential to achievement in the subject.

5. *Students need to learn language that is meaningful.* It is easier to accomplish this when teaching language in a context. Therefore, all teachers, in all subject areas, must attend to concept development. Without adequate concept development, the language students learn is either vague or devoid of meaning.

6. *Students need to learn to develop their thinking skills and to engage in more abstract levels of thought as they mature.* They must learn the language that allows them to express their thinking about concepts. Initially, they need to learn concrete vocabulary and functional sentence patterns as they learn to recall, match, sequence, classify, etc., during activities. Eventually they need to learn more abstract terms and more complex sentence patterns as they grow in their ability to think more abstractly: generalizing, analyzing, imagining, predicting, and evaluating.

7. *Students need to participate in language activities that integrate the language strands of listening, speaking, reading, and writing.* When these strands are taught in isolation from each other in the guise of subjects such as spelling, phonics, grammar, reading, etc., student learning becomes fragmented. Students have difficulty understanding the relationships among listening, speaking, reading, and writing and lose the benefit of one or more strands preparing for and/or reinforcing growth in another e.g., discussion and brainstorming which involve listening and speaking prepare students for writing. First and second language programs should therefore integrate listening, speaking, reading, and writing skills. Specific skills taught will vary with the proficiency level of the students. In the initial stages reading and writing activities should use only language which students have internalized already through aural/oral work. Strong oral proficiency is a prerequisite to learning to read.

   a) Successful readers rely on three language cue systems:

      - grapho-phonemic
      - semantic-associational
      - syntactic

      The ability to use the latter two systems is a function of oral language proficiency. The greater the oral proficiency or degree of internalized language of the students in either their first or second language, the more able they are to use the latter two systems. Reading instruction should not emphasize the use of the grapho-phonemic system to the exclusion of the semantic associational and syntactic systems.

b) Successful writers also rely on three cue systems. They must possess a meaning base on which to draw, a storehouse of vocabulary representing the meaning base (semantic-associational), and an intuitive sense of how the English linguistic system works (syntactic). Mechanical skills (grapho-phonemic) are just the tools which enable students to communicate knowledge more effectively.

8. *Students need to learn "real" language and how to use it in the natural situations in which it is required.* The vocabulary items and sentence patterns used in lessons should be as similar as possible to the everyday language people actually use. Students require opportunities to practice the language by interacting with others. They will not learn to use language effectively solely through individual paper and pencil exercises.

Program content, classroom organization and teaching techniques used to develop concepts and language and skills should:

a) reflect all of the above, and
b) vary according to:

- the language proficiency of the students in the first and second language,
- cultural background (experiences, interests, and cognitive abilities),
- age/grade levels,
- type of topic,
- learning style of students,
- materials and equipment available,
- teaching style of teacher.

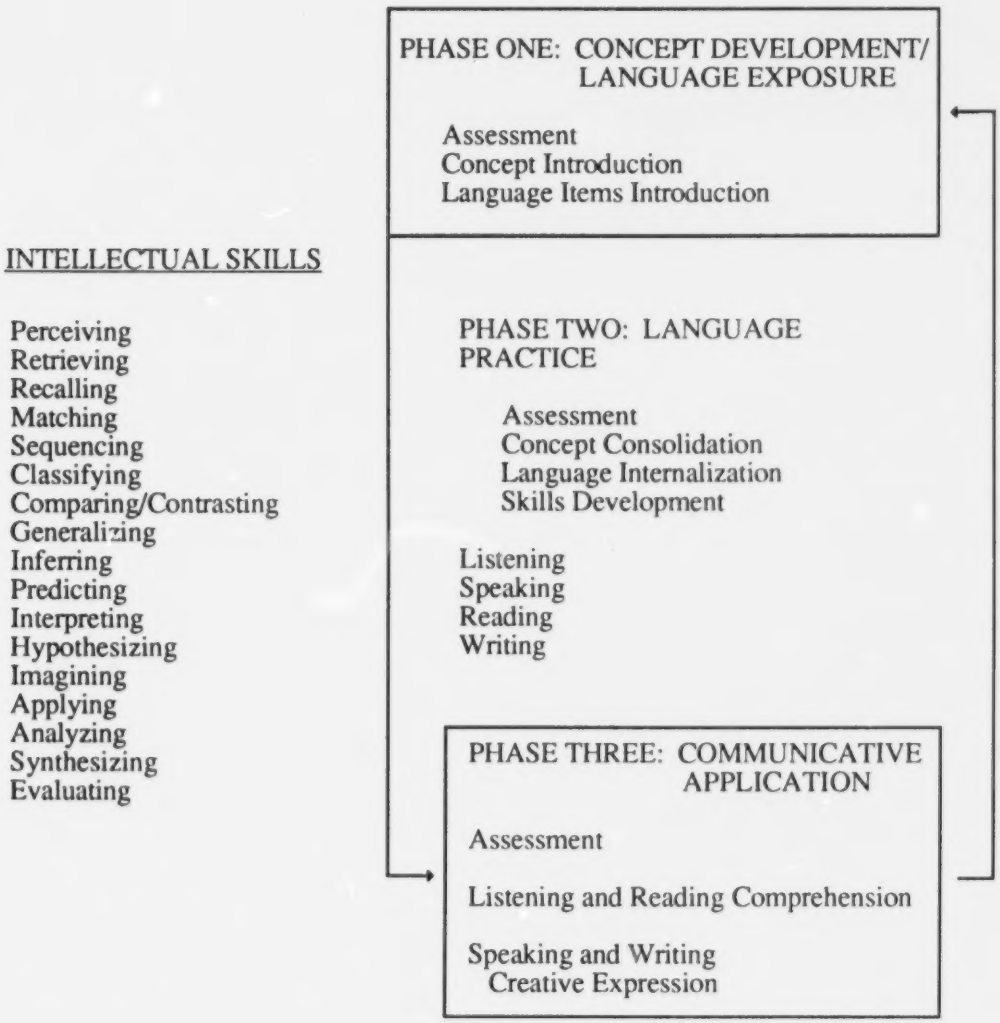
FRAMEWORK

The Language Development Approach uses the following framework to structure lessons involving language learning and conceptual development for all subject areas or for any topics of personal or cultural relevance and interest. The framework consists of three phases:

Phase One: Concept Development/Language Exposure
Phase Two: Language Practice
Phase Three: Communicative Application

LANGUAGE DEVELOPMENT FRAMEWORK

(Based on the work of Jim MacDiarmid
Adapted by B. Pugh and C. McGregor)



Phase One: Concept Development/Language Exposure

At the beginning of this phase, it is important to assess what conceptual and linguistic knowledge students already possess for a topic. This assessment establishes the appropriate starting point for instruction and helps determine which concepts, experiences, and language items to emphasize.

During this phase, students participate in meaningful activities or experiences through which they learn new concepts related to the topic of study. As much as possible, these activities should involve direct, firsthand, active learning with concrete materials. Where necessary, e.g., in a unit on space, indirect or analogous experiences (films, filmstrips) allow students to move beyond the confines of the immediate classroom to explore concepts associated with other times and places. These activities and experiences help students build bridges between what they already know and new concepts.

While they carry out the concept development activities, students hear and use the new language items that express the concepts. They learn to associate new vocabulary with the relevant objects or actions and to express the relationships among concepts with appropriate sentence patterns. It is essential that students learn the meaning of all new language items during this part of the lesson.

You may choose to use the students' first language during this phase when students have little or no English. You can conduct the assessment tasks in their first language to determine the extent of their conceptual knowledge. If the concepts are familiar, concentrate in ESL classes on teaching the related English language items. If the concepts are new, teach them to students in their first language and then introduce English language items. In classrooms where English is the language of instruction, have the Classroom Assistant explain difficult concepts in the students' first language to be sure they understand them.

Phase Two: Language Practice

In Phase Two, students use the new language items introduced in Phase One in a variety of activities that develop listening, speaking, reading, and writing skills. Through intensive practice of items in a variety of ways, students come to "own" the new language, i.e., commit it to memory so that it becomes part of their permanent storehouse of language items. These activities also

continue to strengthen the bond developed in Phase One between the new concepts and the language items that represent those concepts. While the whole class may participate in most of the Phase One activities, it is important to group students for language practice according to their language skills and needs. For students who are not proficient in English, use only language items that they are comfortable with aurally/orally in reading and writing activities.

Phase Three: Communicative Application

The final phase of the lesson sequence provides opportunities for students to use their acquired knowledge and language to communicate in a variety of situations. Students show they have understood the new concepts and can use the new language items as they interact with others. These activities involve students in listening, speaking, reading, and writing to solve problems, bridge an information gap, share information, complete a task, develop an arts and crafts project, share a finished product and explore related concepts and language. While carrying out these activities, the teacher can work individually with students to assess the extent to which they have mastered the concepts and language from the lesson.

In addition to the communicative application activities for each lesson, there are culminating activities at the end of each unit which provide opportunities for students to use all the concepts and language they have learned throughout the unit. During these activities the teacher can meet with students to review their work and what they have learned during the unit.

Intellectual Skills

An essential component of the framework is the development of intellectual skills. Learning new concepts and language involves thinking skills. On the other hand, the ability to think abstractly involves conceptual and linguistic knowledge.

Students who lack the prerequisite basic experiential and linguistic knowledge for a topic cannot engage in activities that require them to apply or solve problems using that knowledge. In moving towards abstract levels of thinking students must:

- acquire simple and concrete concepts and the corresponding labels,

- see patterns and relationships among concepts and form progressively larger and more inclusive conceptual networks in the form of principles and generalization,
- apply the principles and generalizations to new situations, and
- analyze, synthesize, and evaluate old and new knowledge to solve problems.

In the Concept Development/Language Exposure phase, assessment activities establish whether or not students have basic building block concepts and language to engage in more abstract thinking about a topic. Subsequent activities fill gaps and/or extend the students' background. The structured nature of the Language Practice activities demands less high level intellectual activity. Answers are more convergent in nature; the information readily provided or available. However, Communicative Application activities require divergent thinking. Students draw on what they already have learned during the previous two phases to bridge an information gap or solve a problem.

USING THE FRAMEWORK

The Language Development Framework:

- helps students acquire a conceptual background about a topic;
- helps students acquire language to express their knowledge about that topic;
- provides opportunities for students to use their knowledge and related language in a variety of situations; and,
- provides opportunities for students to engage in higher levels of thinking.

The framework forms the basis for the following lessons. Keep in mind that the techniques and activities you use with students depend upon many factors:

- cultural background of students
- learning style of students
- age level of students
- proficiency in English
- type of topic
- materials and equipment available, and
- preferred teaching style of teacher.

RESOURCES: BACKGROUND INFORMATION ON MAGNETS

Good magnets can be purchased from most educational suppliers. Inexpensive magnets sold as toys will probably not be strong enough to do some of the activities suggested in this unit.

Remove your watch before using a very strong magnet.

Keep magnets away from computers and computer disks.

Store magnets in a cool, dry place. Magnets that have keepers should be stored with them attached. Never store magnets close together. (A block of wood may be placed between the magnets.) Don't drop magnets.

RESOURCES: INCLUDED WITH THIS UNIT

Lesson: Types of Magnets

- Illustrations of various types of magnets.

RESOURCES: RELATED ENGLISH MATERIALS

Magazines

Back issues of children's magazines may contain activities and information about magnets.

Children's Books

Mickey's Magnet
Franklyn M. Branley and Eleanor K. Vaughan
Scholastic Book Services, 1956

Magnets
Rocco V. Feravolo
Gerrard Publishing Co., 1960

Look at Magnets
Rena K. Kirkpatrick
Raintree Publishers, 1978

Magnets
Laurence Santrey
Troll Associates, 1985

Secret Magnets
Herman and Nina Schneider
Scholastic Inc., 1979

Magnets (A Science Reader)
David Roberts
Whitcombe and Tombs Ltd., 1972

The Real Book of Magnets
Mae Freeman
Scholastic Book Services, 1967

Magnetism
Raymond Holden
Golden Press, 1962

Magnets and How to Use Them
Tillie Pine and Joseph Levine
Scholastic Book Services, 1963

What is a Magnet?
Gabriel Reuben and Gloria Archer
Benefit Press, 1959

Tin; The Knife and Fork
(See How It's Made Books)
Modern Curriculum Press, 1983

From Ore to Spoon
Ali Mitgutsch
Carolrhoda Books, Inc., 1981

Iron Mining Fun Book for Children: Featuring Orville Ore
Constance E. Makela
The Happy Thoughts & Rainbow Company, 1982

Teacher's Resources

Amazing Magnets
David Adler
Troll Associates, 1983

Magnets and Magnetism
Martin L. Keen
Wonder-Treasure Books, Inc., n.d.

Films, Filmstrips and Slides

Magnets! Magnets! (film)
Arthur Barr Productions
3490 E. Foothill Blvd.
P.O. Box 5667
Pasadena, CA 91107

Miscellaneous

Various types of magnets, magnetic display boards, magnetic figures, letters, numbers, etc. are available from most educational suppliers.

Available from Louise Kool & Galt Limited:
1147 Bellamy Road, Unit 6
Scarborough, Ontario
M1H 1H6

Magnasticks - 4 powerful magnets set in a plastic baseboard. 7 storage compartments contain a wide variety of metal pieces in many shapes and sizes.

Magic String - Magnetized cord will cling to metal surfaces and can be used to make designs.

Magnet Building Set - A powerful horseshoe magnet, small disc magnets and various shaped metal pieces and ball bearings provide many opportunities for discovering magnetic properties. Contains a metal baseboard on which to make constructions.

Available from Boreal Science Catalogue
1820 Mattawa Avenue
Mississauga, Ontario
K4X 1K6

Magnetic Field Projectual - Transparent unit filled with metal filings suspended in a special viscous fluid. Place magnet under the unit to observe lines of magnetic force.

Lodestone Natural Magnet

Iron Filings Tube - Sealed glass tube with a bulb at one end containing iron filings. When bulb end is stroked with a magnet, the filings become magnetized until the tube is shaken.

Floating Magnet - Demonstrate that like poles repel each other. One cylindrical magnet floats above another is a wire frame on a plastic base.

Variety of Magnetic Compasses.

RESOURCES: RELATED ABORIGINAL LANGUAGE MATERIALS

INITIAL ASSESSMENT ACTIVITIES

The following activities should be done before you teach any of the lessons. They will assist you to determine:

1) what students already know about the concepts of the topic and therefore where instruction should begin;
2) what interest students have in the topic and therefore the direction the unit should take;
3) what language students already have to discuss the topic and what language they require.

One of the basic principles of the Language Development Approach and of all good teaching is that you should start with the student when planning and carrying out a unit. Before you begin to teach it is important to assess your students' knowledge of and interest in the topic. You should determine what students already know about the topic/concepts you intend to cover. What ideas do students already have? What misconceptions do they have which you must address? What gaps are there in their knowledge which require that you teach certain lessons? What concepts do they know well enough so that you can skip the lessons which teach those concepts? What questions do they have? What relationships do they see between different aspects of the topic?

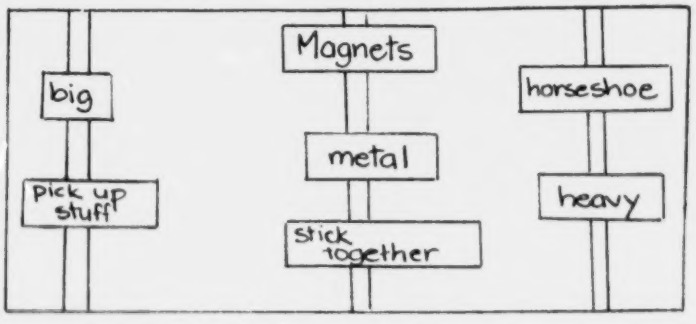
It is also important to identify what experiences students have which relate to the topic/concepts. By identifying these and building upon them in the lessons you can help students relate the new ideas and information to their own lives. It is important to do this because it assists students to internalize new concepts and make them part of the conceptual framework which they use to understand and describe their world. If they do not have concrete, firsthand experiences to relate to each concept you will have to provide them wherever possible.

Another use for these activities is to help you identify particular interests of individuals, groups of students, or the whole class. You can then include activities in lessons which involve student interests, thereby increasing motivation for them to participate and learn. You may decide to add, substitute or omit some lessons because of students' interests.

These activities will also help you determine what language students have to discuss the topic. You can find out what vocabulary items students already know and what associations they have for each word. It is important to ascertain the meanings students attach to words; sometimes their interpretations may surprise you! If they do not clearly understand terms or they use them incorrectly, it will prevent them from understanding and incorporating the concept into their mental framework.

1) Brainstorming:

Place several different types of magnets on a table. Allow students time for free exploration with them. Do not verbalize the concepts for them at this time; instead ask them to tell you what they have discovered about magnets. Record their ideas on cards and hang them on masking tape strips (sticky surface up) which you fasten to the wall or the chalkboard.



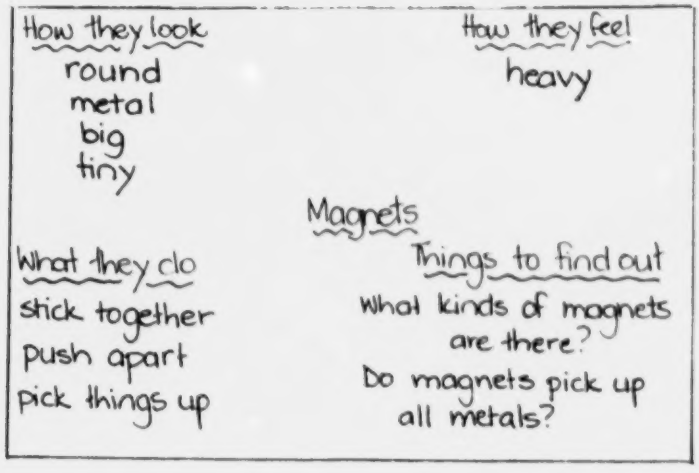
If students have difficulty with this activity you may wish to direct their thinking or prompt ideas by asking more specific questions. Encourage students to predict answers to these questions even if they aren't sure of the exact responses. It might be interesting to record their predictions separately and compare them to the actual answers as you study the unit. Students may think of their own questions as well. Keep a list of all the questions the class cannot answer to focus the lessons you teach during the unit.

After you record their responses on the cards have students chant the words with you. Talk about the words: Which word is the most interesting? the least? the most puzzling? What other word can you think of that means almost the same thing? What comes to your mind when I say _____ ? What do you think this word means? Etc.

2) Categorizing:

Distribute the word cards from the brainstorming session. Be sure to tell students the words you give them. With younger students, give each one only one card so they will not get confused. Have one student place his/her word card at the top of one of the masking tape strips and tell the word to the class. Ask if there is anyone else who has a word that belongs with the first word. Have another student place his/her word card under the first, read the word and explain why it belongs with the first word. Give a title to these two cards which now form a category. Ask if anyone can start a new category. When students have placed all of the brainstormed words in categories, discuss the titles and change them if necessary. Chant the words in each category with students. Transfer the words to a flowchart to provide a permanent reference.

As you teach the unit you may wish to add new information to the chart. You may also identify new questions and, hopefully, the answers. At the end of the unit you can review the chart with students. Keep it as a reference for future use.



SAMPLE QUESTIONS

QUESTIONS FOR ASSESSING LANGUAGE:

1. What do you think these words mean?
2. What comes to your mind when I say _____ ?
3. Have you heard of the word(s) _____ ?
4. What words can you think of when I say the word _____ ?

QUESTIONS FOR ASSESSING EXPERIENCE:

1. Have you been in a situation where _____ ?
2. What do you know about _____ ?
3. Have you ever seen _____ ?
4. Have you ever experienced _____ ?
5. Have you ever been _____ ?
6. Have you ever done _____ ?
7. Has something like this ever happened to you?
8. When was the last time you _____ ?

CONVERGENT/GENERALIZING (Getting the main idea):

1. What are the chief points?
2. Given that information, what is the main idea?
3. What is the single most important idea?
4. State the idea in one sentence.
5. Explain _____ .

DIVERGENT/USING/APPLYING:

1. What might happen if _____ ?
2. If you use that idea, what would it mean for _____ ?
3. Apply that idea to our (this) situation.

4. What would result if _____ ?
5. If you were given these facts, what would you do to _____ ?
6. How would it be different if we used this idea?
7. What could the advantages/benefits be if we applied this idea/process?
8. What do you think the story/paragraph will be about?

EVALUATION/JUDGING/VALUING:

1. How do you feel about this idea?
2. What is your opinion?
3. What is the best _____ ?
4. Are you satisfied with that answer/plan?
5. Can this statement be made? Why?
6. Out of all the information, what can be used to prove your point?
7. How would you judge?
8. What is your opinion or conclusion about the product/plan/idea?
9. Why did you think it worked/didn't work?
10. What is fact? What is opinion?

ACTIVITY IDEAS

TOPIC A: PROPERTIES OF SOLIDS

Science/Social Studies	Mathematics
1. Classify items in the classroom as metal/not metal. 2. Which metals rust? Collect examples of rusty or tarnished metals. Observe when and where rusting takes place. (indoors, buried outside, exposed outside, etc.) After a time, collect the cans. Which designs rusted? Which didn't? Talk about methods used to keep metals from rusting (painting, oiling, plating with tin, etc.). 3. Start a scrapbook about metals. Have student cut pictures from magazines that show the ways in which we use metals. 4. Write to a mine in your area to obtain information about the type/s of metals mined there and the mining process used. 5. Make a list of common metals that we used everyday - steel, nickel, iron, gold, silver, etc. Try to find examples of each.	1. Place a magnet near a small metal ball bearing (or paper-clip). How close can you put the magnet without causing the ball bearing to move? Measure the distance using a strip of paper, a ribbon or a metric ruler. Repeat using different objects or larger magnets.

Language Arts

1. Keep a diary for one day, noting all uses of metals. For example, "I got up when my metal alarm clock rang at 7 o'clock. The metal springs on my bed were poking through the mattress. I got up and took my washcloth off the metal hook in the bathroom. Etc."

2. Brainstorm words to describe metals. Categorize the words: colour, weight, strength, etc. Write the words in alphabetical order. Use them in sentences.

Music/Poem/Stories

1. Make simple musical instruments using common metal objects:

   Hang copper pipes (or steel spikes) of various lengths from a piece of dowel. Strike them with a stick or hang them where they will catch a breeze.

   Make finger cymbals from pop bottle caps or full sized cymbals from old pot lids.

   Make bells using old tin cans and spikes.
   Make triangles by bending metal knitting needles. Use nails as strikers.

Physical Education/Movement

Have a student pretend that his/her hand is a strong magnet that can pull you close to them. Have this student stand face with another student. As the "magnetic" hand of the student moves towards the other student, the other must react. (i.e.) If you put the magnetic hand beside the other student's head and move it away, the other student must lean in the direction of the moving hand. Practice different movements and see if you can make the other student lean or bend in different ways.

Art

1. Metal Rubbings: Use paper and charcoal or aluminum foil to make rubbings of coins, belt buckles, metal grates, etc.
2. Junk Sculptures: Collect old tin cans, springs, pop can pop-tops, scrap metal car or skidoo parts, etc. Glue things together to make sculptures. Spray paint the sculptures or leave them as is.

Special Activities

1. Encourage students to start collections of metal objects: a coin collection, a jewellry collection, a metal toy collection, etc. Display the collections in the classroom.

LESSON: PROPERTIES OF METALS

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. Solids have distinct properties: (Review: See POPCORN unit.)
   a) ability to retain their shape, can be stacked.
   b) can be poured only if in small pieces.
2. Solids can differ in colour, size, shape, mass and hardness. (Review: See POPCORN unit.)
3. Some solids are metal; some are not.

English Vocabulary: (*actually developed in this lesson)

*metal
*shiny
*hard
*bend/bent
*hammered flat
*strong
*feels cold

English Sentence Patterns: (*actually developed in this lesson)

*What is a metal?

*A metal is something that is shiny.
is hard
is strong
feels cold
can be bent
can be hammered flat
you can't see through

_____ are made of metal.

Metal is used to make _____ .

Special Materials Required

Variety of objects, both metallic and non-metallic.

Concept Development/Language Exposure

1. a) Review the concept, "What is a solid?" (Refer to POPCORN unit.) Have students identify and collect a variety of familiar classroom solids (e.g., pencils, books, paper clips, erasers, tacks, crayons, balls, coins, toys, etc.). Have them sort the solids by different criteria - colour, size, shape, mass, hardness.

2. b) Place all the metallic objects together and all the non-metallic objects together. Ask students to guess what criteria you used to sort the two piles of objects. If they have difficulty, have them focus on the materials from which the objects are made. Try to elicit the word "metal." Write it on the board. Ask students, "What do you think of when I say the word metal?" Record their responses on the board.

Have students help you organize the words into categories. For example, write the word "nails" at the top of a chart. Ask students what other words describe things made from metals. Write these words on the chart under the word "nails." Have students think of a title for the category, (e.g., Things Made of Metal), and write it at the top of the chart. Continue in this manner until all the words from the brainstorming activity have been listed in a category. Review the lists with students.

2. Show students three spoons: plastic, wood, and metal. Ask them how they are all alike. (They are all spoons.) Ask how they are different. (Size, colour, weight, etc.) Ask students if the spoons would be the same if they were all the same size and were all brown. How would they still be different? (They are made of different materials.) Examine the metal spoon with students and ask them to describe its properties: What colour is it? Is it hard or soft? Can you see through it? Is it rough or smooth? Can you tear or break it? Can you bend

it? Can you stretch it? Can you put a dent in it? Refer to the chart made in the previous activity. Invite students to add new words to any of the categories.

3. Have students go on a scavenger hunt to find things that are made of metal. Examine each item with students. Do you agree that they are all made of metal? Model the sentence patterns as you examine the items with students.

4. Allow students time to experiment with the metal objects. Have them try to hammer them flat, scratch them with nails, shine them with metal polish, bend them, etc., Move around the classroom and model sentence patterns as often as possible.

Language Practice

L 1. Upset the Basket: Tell each student one of the statements about the properties of metals (e.g., "A metal is something that is shiny.). Give each statement to at least two students. Have chairs for students arranged in a circle. Stand in the center of the circle and call out one of the statements. The students who were given that statement try to change places before you can get to one of their chairs. Occasionally, you should call, "Upset the basket!" Then everyone tries to get to a new chair, including you.

L 2. Thumbs Up/Thumbs Down: Make statements using the sentence patterns. If they are true, students give the "thumbs up" signal; if they are false, students give "thumbs down" signal.

L 3. Elimination: Recite a list of statements about the properties of metals. Include some false statements. Students raise their hands when they hear a false statement.

E.g., Teacher: "A metal is something that bends."
"A metal is something that feels sticky." (Students raise hands.)
"A metal is something that is shiny."
Etc.

L/S 4. Echo Drill: Make a statement. Students repeat it immediately. To make this activity more difficult, insert false statements which students are not to repeat.

L/S 5. Hot Potato: Students sit in a circle on the floor and listen to a statement which they will have to repeat. Pass a metal object around the circle as music plays. When the music stops, the student holding the toy repeats the statement.

L/S 6. Cumulative Chain Drill: Sit with a small group of students in a circle. Make a statement. First student must repeat the statement and add another item. Continue around circle in this manner until all students have added another item.

E.G., Teacher: "A metal is something that is hard."
Student A: "A metal is something that is hard and shiny."
Student B: "A metal is something that is hard and shiny and that you can't see through."
Etc.

L/S 7. Sentence Strips: Have students dictate statements describing the properties of metals. Record these on sentence strips and place them in the pocket chart. Read the statements with students. Have them match word cards to words on the strips. Cover key words in the statements and have students place word cards in the correct spaces.

R 8. Classification Containers: Write statements about the properties of metals on small sentence strips. Some of the statements should be false. Students read strips and sort them into containers labelled TRUE and FALSE.

R/W 9. Scrambled Sentences: Provide each student with a worksheet of statements about the properties of metals. The words in each statement are scrambled. Students unscramble the words and write the correct statements. Be sure that models of the statements (i.e., sentence strips in pocket chart) are readily available.

Application

1. Place three objects, only one of which is metal, in a feely box. Have a student reach into the box and try to determine which object is made of metal. Ask him/her to describe how the object feels. Remove that object and have students discuss whether the object is actually made of metal.

2. Provide strips or tubes of metal of different types - iron, aluminum, copper, etc. Have students compare them in terms of how easily they bend, how easily they flatten, how hard they are, etc. Discuss how these properties make the metals useful. Students should begin to appreciate that there are shapes which metals can take which are not suitable for other materials and that there are particular uses of metals which can not be duplicated by other materials.

3. Have students keep lists of metal objects they observe in the school, at home and around the community. Assist them in organizing the lists into categories, for example:

   Metals in the Kitchen
   Metals on the Trapline
   Metals that Move (Transportation)
   Metals on Our Clothing
   Etc.

LESSON: SOME SOLIDS ARE MAGNETIC; SOME ARE NOT

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. Some solids are attracted by magnets; some are not.

English Vocabulary (*actually developed in this lesson)

*attracted/not attracted
*magnetic

English Sentence Patterns (*actually developed in this lesson)

_____ is/are attracted by magnets.
_____ is/are not attracted by magnets. (Exposure only.)
*_____ is/are magnetic.
*_____ is/are not magnetic.
A _____ is magnetic, but a _____ is not.
Magnets attract _____ but not _____.

Special Materials Required

Magnets
Variety of items (magnetic and non-magnetic)

Concept Development/Language Exposure

1. a) Divide class into small groups. Provide each group with a magnet, a variety of magnetic and non-magnetic items and a record keeping sheet. Have each group take one item at a time and put it close to the magnet. If the item is pulled to the magnet, they should list it or draw it on the record sheet under "Things attracted by magnets." If the item is not pulled to the magnet, they should list or draw it under "Things not attracted by magnets."

   Have groups compare their record sheets: What things were attracted by the magnets? Did colour make a difference? Size? What was the same about all the items?

   b) Give each group a magnet, a variety of magnetic and non-magnetic items (different from those used in the above activity) and a record keeping sheet. Have each group examine the items given to them and predict whether or not each will be attracted by the magnet. If they think it will be attracted, they should list or draw it under "Things we think will be attracted by magnets." When their predictions are complete, have them put the magnet close to each item. Were their predictions correct? Have them indicate correct predictions on their records. Have each group present their findings to the class. If they had any predictions that were incorrect, have them discuss reasons why the item was or was not attracted to the magnet. (Students may have predicted that any items made of metal would be attracted. They should now realize, however, that only certain types of metal are attracted. You may wish to inform them that only metal objects containing iron, nickel or cobalt will be attracted by magnets.)

2. Introduce the word "magnetic" to students by using it in the sentence pattern to describe actual objects, for example:

   Teacher: "A paper clip is magnetic."

   Teacher: "A crayon is not magnetic."

After describing several items in this manner, ask students if they can tell you what the word "magnetic" means. Model the patterns again with other items.

Language Practice

L 1. Key Phrase: Ask students to listen for a specified sentence. When they hear it they should stand up and clap once.

E.g. "When you hear 'A tack is magnetic.', stand up: A book is magnetic; a tack is magic; a tack is magnetic."

L 2. Object Relay: Divide class into two teams. Place two identical sets of objects at the front of the room, one set for each team. Call out the name of one of the items (using the sentence patterns). The first member of each team races to find the item and returns with it to the end of his/her line. The first player to return to his/her team scores a point.

Later, you may ask students to repeat the statement before returning to their teams.

L 3. Find the Object: Students stand in a circle holding hands. One student stands outside the circle. Place objects on the floor in the center of the circle. Call out a statement, for example, "A nail is magnetic." The student standing outside the circle tries to enter the circle to get the object named, while the other students try to prevent him/her from doing so by raising and lowering their arms. When the student does reach the center, she/he must locate the correct object. Repeat until all students have had a turn.

L 4. True/False: Give each student a card. Have them print True on one side and False on the other. Make statements about objects which you hold up. If students agree with a statement, they display the True side of their cards; if they disagree, they display the False side.

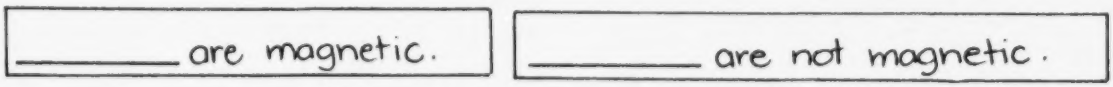
E.g., Teacher: "A pin is magnetic."
Teacher: "A penny is not magnetic."

L/S 5. Substitution Drill: Make a statement, "A nail is magnetic." Then, hold up another magnetic object, for example, a paper clip. Students repeat the statement, substituting the name of the object, "A paper clip is magnetic."

L/S 6. Bean Bag Toss: Begin a statement, "A thumb tack is ...", and toss a bean bag to a student. The student catches the bean bag and completes the statement, "A thumb tack is magnetic."

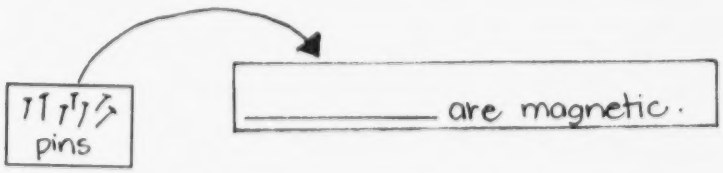
S 7. Scavenger Hunt: Give each student (or pair of students) a magnet. Tell them that they have three minutes to find objects in the classroom that are magnetic and bring them back to the circle. When time is up and students have returned to the circle, have them take turns holding up their objects and describing them using the sentence pattern, "____ are magnetic." You may wish to repeat this activity and have students locate objects that are non-magnetic.

S/R 8. Sentence Strips: Place sentence strips as shown in the pocket chart.



Make word cards by taping small objects (magnetic and non-magnetic) to cards and writing the words below.

Distribute word cards to students. Have each student, in turn, place his/her card in the appropriate sentence strip and read the completed statement.



R/W 9. Word Substitution: Give students a sentence with one word underlined. They form new sentences by substituting other vocabulary items for the underlined word.

E.G., A paper clip is magnetic.
A nail is magnetic.
A tack is magnetic.
Etc.

Application

1. Make several fish from construction paper. Tape one small object to the head of each fish. (Include both magnetic and non-magnetic objects - paper clip, small nail, metal washer, tack screw, piece of crayon, bit of wool, coins, etc.) Put out "fishing poles" with magnets attached to the ends of strings. Allow students to play "Go Fishing." Observe which students test each fish and which choose only the fish they know they can "catch." Change the objects on the fish and let students play again.

2. Have students make a bulletin board showing magnetic and non-magnetic objects.

3. Make up mixtures of magnetic and non-magnetic materials. Students use magnets to sort the materials.

   E.g., Some mixtures you might try: toothpicks and straight pins
   nails buried in sand
   tacks and rice
   etc.

4. Discuss other ways in which the word "magnetic" is used, for example, what does it mean when we say that someone has a magnetic personality?

ACTIVITY IDEAS

TOPIC B: MAGNETS

Science/Social Studies

*1. Provide a table where magnets, magnetic and non-magnetic objects, paper, pencils, etc., are available. Allow students time for free exploration with the materials.
*2. Make a list of ways in which we use magnets everyday. Start a collection of household or school objects which have magnetic parts (fridge magnets, can openers, magnetic key hiders, paper clip holders, etc.). Take pictures of those that you can't move (refrigerator door sealing strips, car seat-belt clasps, cupboard door latches, etc.) Discuss who uses the objects and how they use them.
3. Hold a magnet close to some sand. Are any of the sand grains attracted to the magnet? What colour are these grains? Where do you think these grains come from?
4. Place several ring magnets on an unsharpened pencil. Do they attract or repel each other? Remove them and try stacking them in another way. What happens?
5. Does size determine the strength of a magnet? Provide students with several magnets of different sizes and a box of paper clips. Ask them to predict which magnet will hold the most clips and which will hold the least. Have them test their predictions and record their results. What did they find out?
6. Research the history of magnets.

Mathematics

1. Half fill a large bag with nails. Tie a strong magnet to a stick to make a fishing pole. Students take turns dipping the magnet into the bag, then counting aloud the number of nails they have pulled out. Graph the number of nails each student "catches". Use terms "more than" and "less than" to compre the nails caught. Repeat using a different magnet.

2. Write math problems on coloured paper fish. Fasten a paper clip to each fish. Place fish in a large plastic tub. Students take turns using magnetic fishing poles to catch fish. They must solve the problems written on the fish they catch. (Solutions may be written on the backs).

3. Place plastic magnetic numerals in one bag, operational signs (ie: +, -, x, and +) in another, and plastic magnetic shapes in another. Students write number facts using the numerals and operational signs, and illustrate them with the shapes.

Language Arts

1. Print letters on separate small squares of paper. Put a staple through each square. Put the squares in a small basket or lay them on the floor. Students fish for the letters in their names using a magnetic fishing pole.
   Variations: Have each student fish for a specified number of letters. They must try to make words using letters they catch.
2. Take pictures over the course of the unit. Have students annotate the photographs explaining what they were trying to find out, how they were finding out, and the results of their activities.
3. Have students brainstorm all the concepts they have learned about magnets. Record on a chart. Discuss.
4. Make magnetboard figures to illustrate favourite stories. Use felt, fabric or paper to make the figures. Stick magnetic tape on the backs of the figures.
5. Brainstorm situations in which it would be helpful to have a strong magnet, for example:
   - you spilled a box full of pins
   - a glass jar full of nails falls and breaks on the floor.
   - your father dropped his keys down a crack.

   Write stories about these situations.

Music/Poems/Stories

Physical Education/Movement

1. Magnetic Pick-up Sticks: Find several nails with large flat heads. Set them on their heads about 1 cm apart in a random pattern. Using a magnet, try to pick up them up one at a time without knocking any other nail over.
2. Remove the Clips: Give each player 15 paper clips, a magnet and a galss. Have them place the clips in the glasses. At a signal from teacher, players try to remove clips from the glasses by pulling them with the magnets up the outside of the glasses. The first player to empty his/her glass is the winner.
3. Relay Race: Divide class into two teams. Have the leader from each team magnetize a nail. The first member of each team then runs to the front of the room, picks up a tack with the nail, then carries the tack back to his/her team where s/he deposits the tack in the box. How many tacks can each team put in the box before the nail becomes demagnetized?
4. Magnetic Fishing Game: Make a fishing pole with a magnet for a hook. Spread a variety of small magnetic objects on a table behind a screen. Assign a point value to each of the objects, for example, 5 points for a screw, 4 for a nail, 3 for a washer, 2 for a a paper clip, 1 for a tack. Students take turns fishing over the screen. When all players have had a specified number of turns, they total their points to determine the winner.

Art

1. Make junk sculpture with magnetic materials. Put out a box of junk and a magnet. Students test materials from the box and set aside those that are attracted to the magnet. They then use these materials to build sculptures. Demonstrate how things can be attached using metal twist ties, wire, pipecleaners, etc.

Special Activities

1. Make magnets a standard part of classroom cleanup equipment. Hang magnets near the workbench area, sand area (to retrieve steel toys from the sand), with the paper clips, straigth pins and tacks, etc.

Lesson: Types of Magnets

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. There are different types of magnets.
2. Some magnets get their names from their shapes.
3. Some magnets are big, some little

English Vocabulary (*actually developed in this lesson)

* bar magnet
* U magnet
* horseshoe magnet
* rod-shaped magnet
* ring magnet
* disc magnet

English Sentence Patterns (*actually developed in this lesson)

* What kind of magnet is this/that?
* That/This is a _____ magnet.

Special Materials Required

Variety of magnets (if possible, several of each type)
Outline figures of various magnets

Concept Development/Language

1. After students have had an opportunity to experiment freely with the various magnets, have them group them in different ways: size, shape, weight, etc. (If you do not have a large selection of magnets, provide paper models using the outline figures provided.) Encourage different types of classification and let the students set up their own criteria for classification. Each time the magnets are grouped ask students to explain the basis for the grouping.

2. Introduce the names of the various magnets. Help students realize that most magnets get their names from their shapes. (E.g., Try to obtain a real horseshoe. Explain its function. Have students compare the horseshoe magnet to an actual horsehoe).

   Ask students why they think there are different types of magnets. (We use different types of magnets in different ways.) Have them pretend to be bar magnets and spread their arms as wide as they can. Now, have them try to pick up chairs with one of their outstretched hands. Is it difficult? Have them pretend to be horseshoe magnets or U magnets and put their hands close together in front of them. Have them use both hands to pick up chairs with both hands. Is it easier?

3. Trace around each magnet on a large sheet of paper. Repeat the names several times and label each outline.

   Model the sentence patterns using a puppet, for example:

   Teacher: "What kind of magnet is this?" (Points to magnet on paper or holds up actual magnet.)

   Puppet: "That's a horseshoe magnet."
   Etc.

Language Practice

L 1. Thumbs Up/Thumbs Down: Make statements about the types of magnets as you hold them up, one at a time. If you name magnet correctly, students give "thumbs up" signal. After some practice, ask students to provide the correct name for a magnet that you identified incorrectly.

L 2. Magnet Mix-Up: Give each student a picture of one of the magnets. (At least two students should have the same pictures.) Call out the name of one of the magnets; the students with pictures of that magnet change places. Occasionally, you should call, "Magnet Mix-Up!" Then all students change places.

L/S 3. Treasure Chest: Place a variety of magnets in a box labelled "Treasure Chest." Say, "Please get a _____ magnet from the Treasure Chest," and assign a student to do so. If the student chooses the correct magnet, he/she makes the next request of a fellow student.

L/S 4. Hurry Up: Draw pictures of various magnets on one side of the board for Team A, and the same pictures on the other side for Team B. Call out one of the magnet names. One member from each team runs to cross out that picutre on his/her team's side. As they do so they name the magnet (e.g., "That is a horseshoe magnet.").

Variation: This could also be done as a reading activity - write the words on the board instead of drawing pictures.

L/S 5. Chain Drill: Distribute magnets to a small group of students and have them sit in a circle. Ask first student, "What kind of magnet is that?" Student holds up his/her magnet and names it, "This is a horseshoe magnet," then asks the question of the student sitting next to him/her.

S 6. Bean Bag Toss: Form a circle. Toss a bean bag to one student. He/she must name a magnet and toss the bean bag to another student who calls out the name of a second magnet. Continue until all students have had a turn to call out the name of at least one magnet.

S 7. Concentration: Make up a set of picture cards (two pictures of each magnet). Place cards face down on the floor. The first student turns over two cards and says the names of the magnets pictured. If they are the same, he/she may keep the cards; if they are different, he/she replaces them in the face down position.

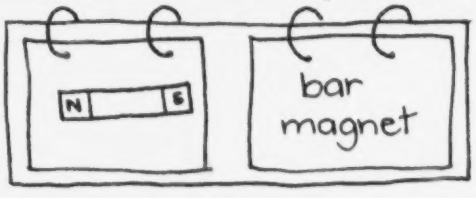
S 8. Mystery Bag: Place a few magnets in a bag. One student reaches in and picks a magnet but does not withdraw it from the bag. He/she describes the magnet and tries to name it.

L/R 9. Wax Resist: Paint the names of the magnets on a large sheet of paper with wax. Tell a short story about magnets. As you say one of the vocabulary items, paint over it on the paper with dark coloured paint. The word will

magically appear. Have students match outlined figures of the magnets to the words on the paper.

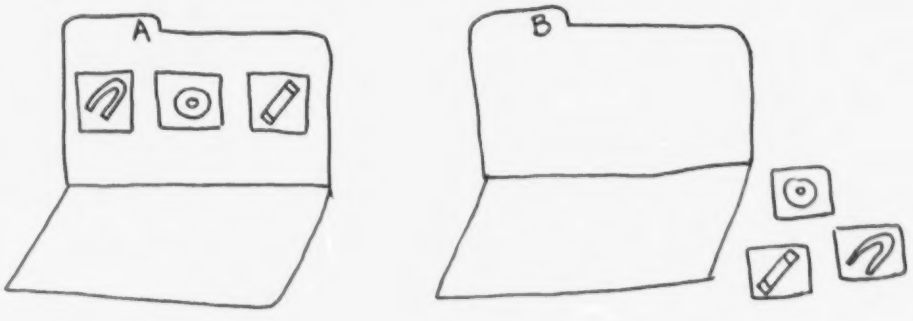
R 10. Find the Magnet: Divide class into two teams. Place pictures (2 sets) of magnets around the classroom. Give the two teams an equal number of sentence strips to match with the pictures. The first team to match all of their strips wins.

R/W 11. Flip Books: Have each student make a flip book as shown below.



Application

1. Folder Game: Student A holds a folder with pictures of magnets pasted in a sequence. Student B holds the same pictures in random order. Student A must describe each picture in his/her folder. Student B attempts to arrange his/her pictures in the same order according to the descriptions given.



Lesson: Magnets Have Magnetic Fields

As this unit emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. A magnetic field exists around every magnet.
2. The magnetic field is strongest at the poles.
3. Magnets can move some objects without touching them.

English Vocabulary (*actually developed in this lesson)

* poles
* magnetic field
* iron filings
* names of various magnets

English Sentence Patterns (*actually developed in this lesson)

*Every magnet has a magnetic field; a _____ has a magnetic field.

Special Materials Required

Variety of magnets
Sheet of heavy paper (Bristol board)
Iron filings/salt shaker

NOTE: It is important to be aware of the danger of iron filings to the eyes. Warn students to keep their hands away from their faces when they are working with the filings. Filings should be kept in closed containers and used with teacher supervision. Iron filings are also very difficult to remove from magnets. Sprinkle the iron filings onto paper rather than directly on the magnets.

Concept Development/Language Exposure

1. Fill a clear plastic medicine vial with iron filings. Fill other vials with shavings from crayons and pencils, small paper clips, beads, and ground black pepper. Have students use magnets to see what happens to the materials inside the vials. Talk with students about the results. Can they name all of the materials inside the vials? Some students may suggest that the iron filings and the pepper are the same material. If this is the case, have students test both vials with a magnet and ask, "What do you know about the material a magnet will attract?" Students should recall that a magnet attracts materials made of iron. Identify the material in the vial as iron filings. To demonstrate that iron filings are really little pieces of iron, use a metal file to file an iron nail. (Have students test the nail with a magnet before you file it.) Let the filings fall from the nail onto a sheet of white paper. Compare them with the filings in the vial.

2 a) Provide each small group of students with a magnet and a paper clip. Ask students to predict how far away from the clip they may hold the magnet and still have it attract the clip. Have them test their predictions. Ask students to explain why the magnet does not have to actually touch the paper clip in order to attract it. Record their ideas.

b) Tell students that you will show them something which may help to explain why the magnet does not have to touch the paper clip. Place a magnet under a sheet of heavy white paper. Shake iron filings from a salt shaker evenly over the paper. Some of the filings will immediately align themselves in the lines of force. Have students describe the pattern formed by the filings. Explain that this pattern shows the area in which the magnet's force is at work. Ask students to note where the most filings contrate on the paper.

Repeat the above procedure using several different magnets. Model the sentence pattern as you hold up each magnet, "Every magnet has a magnetic field; a horseshoe magnet has a magnetic field."

Language Practice

L 1. Same/Different: Ask students to listen for three words that are exactly the same. They should clap when they hear these words:

E.g., Teacher: "Magnetic, magnet, magnet."
"Magnets, magnet, magnetic."
"Magnetic, magnetic, magnetic." (Students clap.)

L 2. Word Chairs: Have all students except one sit on chairs arranged in a circle. When students hear a previously specified word or sentence pattern, they must change chairs. The student without a chair also tries to sit on a chair.

E.g., Teacher: "Change chairs when you hear magnetic field: football field, farmer's field, magnetic field."

OR

Teacher: "Change chairs when you hear the sentence, 'A bar magnet has a magnetic field': A ring magnet has a magnetic field; a U magnet has a magnetic field; a horseshoe magnet has a magnetic field; etc."

L/S 3. Hot Potato: Seat students in a circle. Hold up a magnet and make a statement about it. (For example, hold up a disc magnet and say, "Every magnet has a magnetic field; a disc magnet has a magnetic field."). Pass the magnet around the circle as music plays. When the music stops, the student holding the magnet must repeat the statement.

L/S 4. Substitution Drill: Make a statement, then provide another word for students to substitute.

E.g., Teacher: "Every magnet has a magnetic field; a horseshoe magnet has a magnetic field. Ring magnet."

Students: "Every magnet has a magnetic field; a ring magnet has a magnetic field."

L/S 5. Correct Me: Make a statement containing inappropriate words. Students repeat the statement substituting correct words.

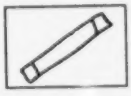
E.g., Teacher: "Every magnet has a magnetic field; a horseshoe magnet has a wheat field."

Students: "Every magnet has a magnetic field; a horseshoe magnet has a magnetic field."

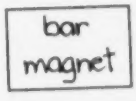
S/R 6. Pocket Chart: Place the following sentence strip at the top of the pocket chart and read it with students.

> Every magnet has a magnetic field; a _____ has a magnetic field.

Distribute pictures of various magnets to students. Have them, in turn, place their pictures in the blank and read the statement to the class.



Replace picture cards with word cards in the sentence strip. Chant with students.



R/W 7. Overhead Vanishing Drill: Write the statements on an overhead omitting words or phrases. Have individual students fill in the blanks (volunteers only). Allow students to refer to written copies. Students can do this activity later as a worksheet.

Application

1. Pour iron filings onto the shiny side of a piece of heavy waxed paper placed on top of an elevated piece of glass. Place a magnet under the glass to make the magnetic field picture. Cover the waxed paper and the filings with a second sheet of waxed paper (shiny side down onto the iron filings). Use an iron set on "low" to iron the two pieces of paper together with the iron filings between them. Make a picture of the magnetic field for each type of magnet that you have. Match the magnets to the pictures. Label the pictures and display.

Lesson: Magnetic Poles

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. Every magnet has two poles.
2. The magnetic field is strongest at the poles.
3. Like poles repel; unlike poles attract.

English Vocabulary (*actually developed in this lesson)

* pole/s
* push away from
* pull toward
* repel
* attract

English Sentence Patterns (*actually developed in this lesson)

Every magnet has two poles.

A magnet is strongest at its poles.

* What happens when like/unlike poles are brought together?
* Like/Unlike poles push away from/pull toward each other.

OR

* Like/Unlike poles repel/attract each other.

Special Materials Required

Bar magnets
Other magnets
Hacksaw blades
Magnetic objects
Worksheet

Concept Development/Language Exposure

1 a) Divide class into groups. Provide each group with a bar magnet. Spread several layers of paper clips in a shoebox lid (one per group). Have each group of students place their magnet in the lid and then lift it out. Ask, "Where are most of the paper clips? Did everybody's magnet work the same way? Remove the paper clips and try it again. Does the same thing happen? What does that tell you about the magnets?"

b) Have students take one paper clip and move it along the length of the magnet. What happens? Where is the pull from the magnet strongest?

c) Introduce the term "poles" and explain that this is the name given to the strong ends of the bar magnets. Have students experiment with how many paper clips they can hang in a chain from the poles of a magnet. Is one pole stronger than the other?

Have students devise experiments similar to those above to locate the poles of other types of magnets. Discuss their findings. (Students should conclude that all magnets have two poles.)

d) Magnetize a hacksaw blade so that it has a pole at each end. Have students conduct tests such as those done previously to establish that the new magnet does indeed have two poles, one at either end of the blade. Ask students to predict what will happen if you cut the blade in half. How many poles will each half have? Where will the poles be? Cut the blade and allow students to test their ideas. Discuss the results. Cut the blade again. How many poles will each piece have now? Where will they be? Test ideas. Discuss.

2. Introduce the concept of "like" and "unlike" by having students sort items into sets of two items. Have half the class make sets of items that are the same; the other half should make set of items that are different.

Hold up a set from Group A and use the term "like" to describe the objects in the set:

"These are two like things."

Now, hold up one of Group B's sets. Use the term "unlike" to describe the objects in this set:

"These are two unlike things."

Repeat this procedure several times using different sets.

3 a) Divide class into several small groups and provide each with at least two magnets. Encourage students to experiment with the magnets independent of any other metallic objects. Circulate among the small groups and encourage students to verbalize their discoveries. Ask questions such as: "What happens when you bring one magnet close to the other one? Can you pick up one magnet with another one? Can you place one magnet on top of the other one? Etc." "Encourage students to test all sides or ends of their magnets with the second magnet. Initially, use the terms "push away from" and "pull toward"; when/if you feel students are ready, introduce the terms "repel" and "attract."

b) Hang two bar magnets from strings so that they can swing freely. When the magnets stop moving, they should both be hanging in the same direction. Mark the poles that are pointing north with red marks. Mark the poles that are facing south with blue marks. (You may wish to explain that all magnets have a north-seeking pole and a south-seeking pole. The poles may then be marked with "N" and "S" instead of with colours.) Hold up the magnets and say:

"The red poles are <u>like</u> poles."

"The blue poles are <u>like</u> poles."

"The red pole and the blue pole are <u>unlike</u> poles."

c) Remove one of the magnets from the string. Tell students that you are going to bring the red pole of that magnet close to the red pole of the hanging magnet. Ask them to predict, based on their experiments with the magnets, what will happen. Record the predictions on a chart such as the one below. Demonstrate. Discuss and record the results.

Magnet on string	Magnet you hold	Observations
Red Pole	Red Pole	
Red Pole	Blue Pole	
Blue Pole	Blue Pole	
Blue Pole	Red Pole	

Repeat the procedure, bringing the two blue poles together.

Repeat the procedure, bringing one of the red poles and one of the blue poles together.

Examine the completed chart with students. Help them develop rules that explain the behaviour of the magnets. Model the sentence patterns.

d) Have students make posters explaining pictorially what happens when the poles of magnets are brought together. Label the posters with the sentence patterns and display in the classroom.

Language Practice

L 1. Demonstration: Place the two marked bar magnets on a table. Make a statement using the sentence pattern and call a student's name. Have him/her come to the table and demonstrate the statement with the magnets.

E.g., Teacher: "Unlike poles attract."
Student holds red pole and blue pole together.

Repeat the activity until all students have had a turn to demonstrate one statement.

L 2. Hop the Line: Tell students to listen carefully to statements you make about magnets. When they hear a false statement they should hop over a masking tape line.

E.g., Teacher: "Like poles repel; unlike poles attract; like poles attract; etc.:
Students should hop over the line when they hear "Like poles attract."

L/S 3. Knock Knees: Place the posters made by students in CD#3d) at the front of the classroom. Name two students and have them place bean bags between their knees. Make a statement about magnets, for example, "Like poles attract." Students race to touch the correct illustration. The first student to do so repeats the statement.

L/S 4. Oral Cloze: Use sentence pattern but omit a key word. Students repeat the sentence and supply the correct word.

E.g., Teacher: "Unlike poles hmmmm."
Students: "Like poles repel."

S 5. Bowling: Paper clip smaller versions of the posters to toilet paper rolls. Stand the rolls in a line. Students take turns rolling a ball, trying to knock down a roll. They must describe the picture on any roll that they do knock down.

S/R 6. Sentence Strips: Place the poles of two magnets together in various combinations. Have students describe what happens using the sentence pattern. Record their statements on sentence strips. Read them with students several times. Match them to the statements written on the posters. Have students identify individual words.

Make several copies of each sentence strip. Place them face down on the floor. Students each select a sentence strip, read it and demonstrate the statement using two real magnets.

Put a paper clip on each sentence strip. Make a statement. One student takes a magnet and picks up the sentence strip on which that statement is written. He/she reads the sentence strip to the class.

R 7. Word Scramble: Cut the sentence strips into word cards. Call out one of the statements and the name of a student. The student must collect all the cards he/she needs to make the statement, put them in the correct sequence and read the completed statement.

W 10. Labelling: Provide a worksheet for each student or pair of students. Have them write a statement that explains what will happen in each example shown on the worksheet.

L/W 9. Dictation: Dictate statements to students. Have them write the statements, then illustrate them. Be sure that models (sentence strips) are available for reference.

Application

1. Notion Pictures: Have students draw pictures which exemplify the concepts of the words "attract" and "repel." For example, to illustrate "repel" you could draw a picture of someone spraying RAID on a fly.

2. Magnetic Cars: Find two small metal cards. Attach a bar magnet to the top of each car with tape. Place the cards so the magnets attract. Can one car tow the other? Place the cars so the magnets repel. What happens to the cars?

3. Magnetic Boat: Make a magnet from a steel needle. Push the needle through the top of a cork. Push a tack into the bottom of the cork to act as a keel. Float the cork boat in a tub of water. Use a magnet to steer the boat.

4. Finding Your Way: Introduce the concept that magnets can be used to help you find directions. Tie a string around the middle of a bar magnet. Let the magnet hang from the string until it stops turning. Determine which end of the magnet is pointing north. Print the letter "N" on that end. Tell students you will now be able to find north wherever you are. All you have to do is let the magnet hang from the string until it stops turning. The end that you marked with "N" will always point north. Take your magnet out on the playground. Which way is north? Walk to the store and go inside. Which way is north? Try the magnet in many other places around the community.

   You may also wish to introduce the other directions to students. Hang the magnet from a table top. Let it hang close to the floor. Draw a large circle on a sheet of paper. Write the letters of the four directions on the circle. Place the paper on the floor under the magnet. Turnit so that the letter "N" is under the end of the magnet that points north. The letter "S" shows where south is, the letter "E" where east is, and the letter "W" where west is.

5. Invite a community resource person to your classroom to explain how a compass works. Try to find pictures (or real examples) of compasses to make a display.

Lesson: A Magnet's Force Can Go Through Some Materials

As this Lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts

1. Around every magnet there exists a magnetic field.
2. A magnetic field can pass through some materials and not others.

English Vocabulary (*actually developed in this lesson)

* glass
* air
* water
* cardboard
* paper
* rubber
* names of other common materials

English Sentence Patterns (*actually developed in this lesson)

* What will a magnet work through?
* A magnet will work through _____.
* A magnet will work _____ but not through _____.

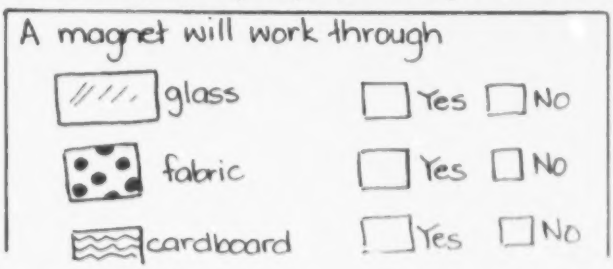
Special Materials Required

Magnets
Squares of various materials

Concept Development/Language Exposure

1 a) Place a magnet about 25 cm away from a paper clip. Ask a student to slowly move the magnet towards the clip. Ask students to guess the distance at which the clip will be attracted to the magnet. Ask students what the magnet's force had to go through to attract the clip. (Remind them that we are surrounded by air.) Model the sentence pattern: "A magnet will work through air."

b) Divide class into small groups. Provide each group with a magnet, a magnetic object and several different kinds of materials (cloth, paper, glass, styrofoam cups, pieces of wood of varying thicknesses, books, pieces of rubber, aluminum pie pans, heavier metal cake pans, etc.) Have them predict which materials the magnet's force will go through, then have them test their predictions. Provide them with a form on which they may record their predictions and test results:



Have groups sort their materials into two categories: materials the magnet's force will go through and materials the magnet's force will not go through. Have them present their findings to the class. Model the sentence pattern for each group's materials, holding up one material from each category.

E.g., "A magnet will work through the paper but not through the book.

2. Make fishing rods with yardstricks, string and magnets. Place magnetic objects in a plastic tub. Have students "fish" for the objects. While they are fishing, ask: "Do you think you would be able to catch the objects if they were under water? Allow time of students to predict and discuss the reasons for their predictions. Have them return their objects to the tub and fill it with water. Have students "fish" for the objects again. Discuss the results. Model the sentence pattern: "A magnet will work through water."

Language Practice

L 1. True or False: Students sit in a circle. Place a variety of materials, a magnet and a magnetic object on the floor inside the circle. Call out a statement such as: "A magnet will work through a book." Choose one student to enter the circle and conduct a test to see if the statement is true or false.

L 2. True or False Tape: Record 8-10 statements using the sentence patterns. Place a magnet, a variety of materials and a magnetic object near the tape player. Students conduct tests to determine whether statements are true or false. This activity could be done as an individual or paired activity in the listening centre.

E.g., "A magnet will work through a piece of paper but not through a wooden block."

L/S 3. Cumulative Chain Drill: Sit in a circle with a small group of students. Make a statement. First student must repeat the statement and add another item. Continue around the circle in this manner until all students have added an item.

E.g.,	Teacher:	"A magnet will work through a piece of paper."
	Student A:	"A magnet will work through a piece of paper and a piece of cloth."
	Student B:	"A magnet will work through a piece of paper, a piece of cloth and a piece of glass."

L/S 4. London Bridge: Two students form a "bridge" with their arms. The other students walk under the bridge as music plays. When the music stops, the bridge drops and traps one student. He/she must answer a question posed by the teacher or other students.

L/S 5. Sorting: Have students sort a variety of materials into boxes labelled: "A magnet will not work through these." and "A magnet will work through these." Ask the question, "What will a magnet work through?" and name one of the students. That student chooses some item from each box and makes a statement about them, for example: "A magnet will work through a piece of glass but not through a sponge."

S/R 6. Sentence Strips: Make up a sentence strip as shown.

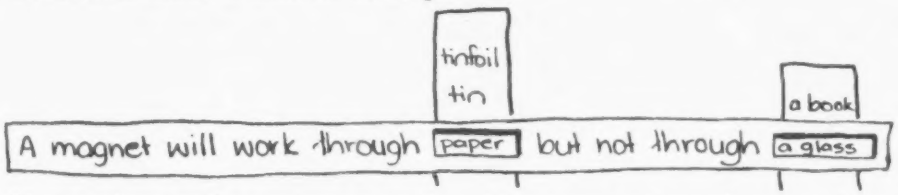
> A magnet will work through _____ but not through _____.

Hold appropriate objects in the blank spaces and read the statement with students.

Have students take turns holding objects in the blanks and reading the completed statements.

Have students match labels to the various materials. Have them place the labels in the spaces and read the completed statements.

R/W 7. Tachistoscope: Make a class-sized tachistoscope as shown. Have students brainstorm words to write on the strips.



Have students make a statement on the tachistoscope and copy it onto a sheet of paper.

Applications

1. Draw a racetrack on a strong piece of cardboard. Use books to elevate the cardboard. Place a steel ball bearing on the cardboard and hold a magnet below. Use the magnet to steer the ball bearing along the racetrack.

2 a) Dancing doll: Push a pin into a magnetic bottle cap. Attach a tiny paper doll to the pin. Use books to elevate a strong piece of cardboard or glass. Hold a magnet under the cardboard or glass and use it to make the doll dance.

b) Magnetic puppets: Make puppets from thread spools with button heads glued on, clothespin puppets with paper clip feet, or pipecleaner puppets. Put a shoebox on its side to make a platform for the puppets. Make the puppets move with magnets held inside the box.

c) Paper Bag Story: Cut out paper figures to illustrate a story. Tape small paper clips to the backs. Decorate a large, brown grocery bag to use as a backdrop. Invert the bag and manipulate the figures with magnets held inside the bag.

3. Set up a waterplay game that depends upon magnetism passing through water. Let students make boats from pieces of styrofoam. Fasten paper clips to the boats with rubber bands. Stack three blocks or books under each end of a rectangular, shallow cake pan. Fill the pan with water. Place boats in the water. Students hold magnets beneath the pan to guide their boats.

Lesson: We Use Magnets

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science perod.

Science Concepts

1. Magnets can be used to hold things together.
2. Magnets can be used to pick things up.
3. Many machines use a special kind of magnet called an electromagnet.
4. We use magnets in our everyday lives.

English Vocabulary (*actually developed in this lesson)

* fridge magnets
* magnetic door catches
* magnetic paper clip holder
* electromagnets
* magnetic screw driver
* names of other objects with magnetic parts

English Vocabulary (*actually developed in this lesson)

* How do we use magnets at school/home?
* We use _____ at school/home to _____.

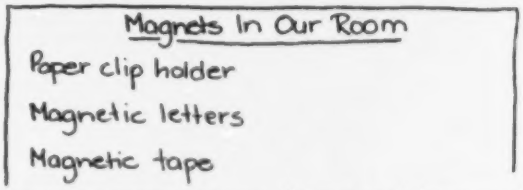
How can magnets be used?
Magnets can be used to/for _____.

Special Materials Required

Magnet board with magnetic letters, numerals, shapes.
Magnetic "Go Fish" game.
Refrigerator magnets.
Magnetic pot holders.
Magnetic door catches.
Magnetic screw driver.
Magnetic paper clip holder.
Magnetic can opener.
Old telephones, doorbells.
Pictures of machines that use electromagnets.

Concept Development/Language Exposure

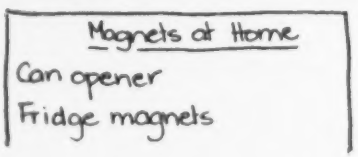
1 a) Ask students to explore the classroom to find out how we use magnets. Record their findings on a chart labelled Magnets in Our Room.



Model the sentence pattern as you discuss each item on the chart.

E.g., "We use a magnet board at school to tell stories."

b) Direct the focus to the use of magnets outside the classroom. Have students bring/describe magnets from their homes, the store, the community hall, the garage, etc. Record these findings on charts labelled Magnets in Our Homes, Magnets in the Store, etc.



Model the sentence pattern as you discuss the items on the charts.

E.g., "We use fridge magnets at home to put notes on the fridge."

c) Discuss the items on the charts: Who uses them? When do they use them? How do they use them? How do the magnets help them work? Etc.

2. Tell students that there are some special magnets that we use everyday. We may not be aware that we are using them. These are called on-and-off magnets or electromagnets. Demonstrate how to make a simple electromagnet:

You need a long nail, a long piece of thin covered wire, and a dry cell battery. Wind the wire around the nail about twenty times. Peel the covering off both ends of the wire. Connect one end of the wire to one screw on top of the dry cell. Try to pick up some paper clips with one end of the nail. Does it work? Why not? Connect the other end of the wire to the second screw on the top of the dry cell. Now touch the nail to the clips. What happens? What do you think will happen if you disconnect one end of the wire? Why do you think this magnet is called an on-and-off magnet? an electromagnet? (Electricity from the dry cell keeps going through the wire that is wound around the nail. This is what makes the nail become a magnet. As soon as the wire is disconnected, the electricity stops going through the wire and the nail is no longer a magnet).

Many machines use electromagnets - scrap yard cranes, telephones, radios, doorbells, televisions, etc. Let students take apart old telephones and doorbells to try to locate the electromagnets.

Model the sentence pattern as you hold up pictures of machines that use electromagnets.

E.g., "We use electromagnets at home in our telephones."

Language Practice

L 1. Which Magnet? Display different kinds of magnets on a table. Make a statement using the sentence pattern and have one student locate the magnet mentioned.

E.g., Teacher: "We use magnetic boxes at school to hold paper clips."
Student locates magnetic paper clip holder.

L 2. Change Game: Students stand in pairs, back-to-back, with elbows interlocked. Make a statement. If the statement is false, students must change partners.

E.g., Teacher: "We use fridge magnets at home to keep cupboards closed."
Students change partners.

L 3. Clues: Display different kinds of magnets on a table. Give a description of one of the magnets. Students try to identify the correct magnet.

E.g., Teacher: "We use this magnet at home. We use it to take lids off cans. This magnet is part of a machine."
Students indicate magnet on a can opener.

After some practice, students may attempt to make up their own riddles.

L/S 4. Echo Drill: Make a statement using the sentence pattern. Students repeat it immediately.

L/S 5. Chain Drill: Sit in a circle with small group of students. Ask question of first student. He/she answers, then asks a question of the next student, and so on around the circle.

E.g., Teacher: "How do we use magnets at school?"
Student A: "We use magnetic letters at school to make words. How do we use magnets at home?"

L/S 6. Hot Potato: Put magnets and pictures of magnets in a paper bag. Seat a small group of students in a circle and have them pass the bag around as music plays. When the music stops, the student holding the bag withdraws a magnet and asks other students a question about it.

E.g., Student A: "How do we use fridge magnets at home?"
Students: "We use fridge magnets at home to put notes on the fridge."

L/S 7. Correct Me: Make a statement containing mistakes or inappropriate words. Students note the errors and suggest substitutions.

E.g., Teacher: "We use electromagnets at home to brush our teeth."

Student A: "We use electromagnets at home in our telephone."

Student B: "We use electromagnets at home in our TV's."

Etc.

S/R 8. Dictation: Refer to the charts made in Concept Development activities. Have students dictate sentences about the magnets indicated on those charts. Record these on sentence strips and place them in the pocket chart. Chant with students. Have them identify key words/phrases.

Distribute sentence strips to students. Have them try to find the magnet that matches their sentence (or have them draw a picture of it).

Cut the sentence strips into word cards. Have students rebuild the sentences.

R/W 9. Sentence Building: Students create sentences by choosing and combining words/phrases from three columns, for example:

We use	fridge magnets	at home	to pick up pins.
	electromagnets	at school	to hold paper clips.
	magnetic screwdrivers	at work	to tell stories.
	magnet boards		to hold things together.
	magnetic numerals		in our telephone.
	etc.		etc.

Students write their sentences and read them to other students who determine if the statements are true or false.

Application

1. Have students work in pairs or small groups to invent new ways to use magnets. Have them actually construct their inventions or draw pictures of them. They should then describe the uses of their inventions to the rest of the class.

2. Make salt dough shapes. (Mix 2 cups flour, 2 cups salt, 1/2 cup hot water, 1 tbsp. powdered alum. Add a teaspoon of cooking oil and some food coloring if you want coloured dough.) Let them dry for several days or place them in a 250 degree oven for about 3 hours. Glue tiny disc magnets or pieces of magnetic tape to the backs of the shapes to turn them into fridge magnets.

Lesson: Making Magnets

As this lesson emphasizes language related to science concepts, you may wish to teach it during your Science period.

Science Concepts:

1. Temporary magnets can be made by:

    a) stroking a magnetic object with a magnet.
    b) leaving a magnetic object in contact with a magnet.

English Vocabulary (*actually developed in this lesson)

* temporary
* permanent

English Sentence Patterns (*actually developed in this lesson)

How you can make a temporary magnet?
You can make a temporary magnet by _____.

Special Materials Required

Magnet
Magnetic objects (needles, nails, hacksaw blades)

Concepts Development/Language Exposure

1. Develop this lesson by introducing a problem - there are four children and one magnet. Each child wants a magnet of his/her own. The magnet cannot be cut into four pieces. How can each child be given a magnet? Let students suggest various solutions. Allow them to test their ideas. Some students may discover that by rubbing a magnetic object (such as a needle or a nail) in one direction on a magnet, that object will be magnetized. Other students may discover that if objects are left attached to magnets for some time they may be magnetized. Still others may find that a magnetic object that is in contact with a magnet will also work as a magnet.

   Discuss the magnets that the students have made:

   What objects will it pick up?

   Is it as strong as the magnet you used to make it? How long will it act as a magnet? What happens over time?

   What happens if you drop your magnet? Can you make it into a magnet again?

   How is your magnet different from the other magnets we have been using? (It is a temporary magnet because it loses its magnetism very quickly. Permanent magnets retain their magnetism and may be used for a much longer time. Discuss the terms "temporary" and "permanent" using examples that are familiar to students).

   Ask students to describe how they made their temporary magnets. Rephrase their explanations using the sentence patterns:

   E.g., "You can make a temporary magnet by stroking a magnet with a nail."
   "You can make a temporary magnet by leaving a needle attached to a magnet for awhile."
   "You can make a temporary magnet by letting a hacksaw blade touch a magnet."

Language Practice

L 1. Merry-Go-Round: Make statements as students march around chairs (one less than there are students). If you make a false statement, students try to get a seat. If they sit down when a statement is true, they are eliminated. Play continues until one player gets the last chair.

   E.g., Teacher: "You can make a temporary magnet by dropping a horseshoe magnet."
   Students try to get seats.

L 2. Simon Says: Give each student in a small group a magnet, a nail and a few paper clips. Call out directions for making temporary magnets. Students make the magnets only if the directions begin with the words "Simon says."

E.g., Teacher: "You can make a temporary magnet by stroking a magnet with a nail." Students do nothing.

Teacher: "Simon says you can make a temporary magnet by stroking a magnet with a nail."

L/S 3. Gossip: Whisper a statement to student sitting next to you. That student whispers it to the next student and so on until has been whispered to all students in the group. The last student must repeat what he/she heard aloud.

L/S 4. Substitution Drill: Make a statement, then provide a word/phrase for students to substitute.

E.g., Teacher: "You can make a temporary magnet by stroking a magnet with a nail. With a needle."

Students: "You can make a temporary magnet by stroking a magnet with a needle."

S/R 5. Dictation: Have students dictate statements telling how to make temporary magnets. Record their statements on sentence strips and place them in the pocket chart. Read them with students.

Place the sentence strips face down in the pocket chart. Have one student choose a strip and turn it over. Have him/her read the strip (perhaps with the assistance of other students) and perform the action that it describes.

Cut sentence strips into words/phrases and have students reconstruct statements.

R/W 6. Scrambled Sentences: Scramble the order of words in the statements. Students write down the correct statements.

E.g., a temporary make stroking by a nail with you magnet can a magnet.
You can make a temporary magnet by stroking a magnet with a nail.

Application

1. Discuss how we should take care of magnets:

They should not be dropped.
They should be stored with their keepers attached.
They should not be stored next to each other.

Use temporary magnets to demonstrate why these rules are important.

Culminating Activities

1. Theme Notebooks - Have students design their own covers for their Magnet Notebooks. These notebooks could include photographs, drawings, descriptions of activities, poems, worksheets, etc. related to the Magnets theme. It is important to let students choose what they will put in their notebooks. The notebooks are their personal "souvenirs" which they may take home to share with family and friends.

2. Magnetic Scavenger Hunt: Divide class into small groups. Provide each group with a magnet and a cassette tape on which you have recorded the following directions:

   Find something magnetic that you use with a hammer.
   Find something magnetic that you use to hold papers together.
   Find something magnetic that you use to sew.
   Find something magnetic that you use to eat.
   Find something magnetic that you use to put pictures on the wall.
   Find two other magnetic things with your magnet.

3. Junk Mobiles: Have students sort the junk collection into two piles: magnetic materials and non-magnetic materials. Have them use the junk to make a "magnetic mobile" and a "non-magnetic mobile."

4. Collage: Make a 3-D collage using real magnets and magnetic materials.

5. Have students pretend to be magnets. Discuss the things they'd do. Record some of their ideas. Write a class story about a magnet using the opening line, "If I were a magnet I'd ..." Students may also wish to write personal stories using some of the ideas that the class brainstormed.

6. Quiz Board: Make a quiz bulletin board about magnets. Make a series of doors which open. On the front of each door write a question about magnets. Write the answer inside the door. Students read the questions, attempt to answer them, then check their answers by opening the doors.

7. Poem: Use Margaret Wise Brown's Bugs" as a model to write a poem about magnets.

   ____ magnets
   ____ magnets
   ____ magnets
   ____ magnets
   We use them in many ways.

   A magnet _____
   A magnet _____
   A magnet _____
   A magnet _____

   We use them everyday.

Brainstorm words to put in the blanks.
Record the poem on sentence strips. Chant it many times. Have students illustrate the poem. Make it into a Big Book.

Evaluation Activities

It is important to assess what your students have learned during this unit. The following activities evaluate language and concepts.

You can do them orally (in small groups or with individuals) to test listening and speaking or on paper to test reading and writing. These are only suggestions; you can substitute different content or vocabulary items to make them more appropriate for your students. You probably will want to include many other activities as well.

1. Tell or give the students four or five words or phrases. Have them indicate which do not belong.

metals:	hard	strong	fluffy	shiny	cold
magnetic:	plastic	glass	iron	wood	

2. Tell or give the students sentence beginnings to match to sentence endings.

Unlike poles	pull toward each other.
Unlike poles	push away from each other.
Like poles	attract.
Like poles	repel.

3. Tell or give the students the beginning of a sentence and a number of possible sentence endings. They indicate which sentence endings are appropriate for the sentence beginning.

Every magnet has	a magnetic field. a black side and a red side. two poles.
A magnet will work through	air. water. a block of wood. paper.

4. Tell or give the students a description of several magnets. They have to indicate which magnet each description fits.

It is rectangular.
It has a pole at each end.
It is a _____.

It is curved.
It looks like something you might find on a horse's hoof.
It is a _____.

Poems, Songs, Stories

Magnet Song (Tune: The Cat Came Back)

Oh a magnet pulls iron and steel.
But it won't pull a wooden wheel.

Oh a magnet pulls iron and steel
But it won't pull a rubber heel.

Two Magnets (Tune: Frere Jacques)

Don Kindt

Take two magnets, take two magnets
That face each other, that face each other,
When you put them closer, when you put them closer
They attract, they attract.

Turn one magnet, turn one magnet
All the way around, all the way around,
When you move them closer, when you move them closer
They repel, they repel.

I'm a Magnet

I'm a magnet, who are you?
I attract things, what do you do?

I attract pins
And I attract tacks.
I attract clips
But I can't attract wax.

I attract pots
And I attract hooks.
I attract keys
But I can't attract books.

I attract _____
And I attract _____.
I attract _____
But I can't attract _____.

Put the Magnet Near the Tack (Tune: London Bridge)

Don Kindt

Put the magnet near the tack
near the tack
near the tack.
Put the magnet near the tack
And it does attract.

Put the magnet near the pencil
near the pencil
near the pencil.
Put the magnet near the pencil
And it doesn't attract.

Put the magnet near the _____
near the _____
near the _____.
Put the magnet near the _____
And it does/doesn't attract.

Tabletop Magnets (Tune: Row, Row, Row Your Boat)

Wendy Stephenson

Pull, pull, pull the pin
Pull it 'til it stops.
Magnets are a lot of fun
Upon the tabletops.

In My Hand (Tune: Did You Ever See a Lassie?)

Wendy Stephenson

In my hand is something metal
something metal
something metal.
In my hand is something metal,
It's shiny and it's sharp.
It's long
and it's silver.
It's hard
and it's flat.
In my hand is something metal,
It's shiny and it's sharp.

(Students guess what it is.)

A knife is made of metal
of metal
of metal.
A knife is made of metal,
It's shiny and it's sharp.

What is Magnetic? (Tune: Farmer in the Dell)

Wendy Stephenson

A tack is magnetic,
A pin is too.
Wood is not magnetic
And neither is glue.

A spoon is magnetic,
And so is a hook
Bread is not magnetic
And neither is a book.

A nail is magnetic,
And so is a spoon.
Water is not magnetic
And neither is a balloon!

The Big Magnet

Wendy Stephenson

"I can pull through anything!" Said the big magnet.
"Try a cloth," said the moth.

"I can pull through anything!" said the big magnet.
"Try a box," said the fox.

"I can pull through anything!" said the big magnet.
"Try a dish," said the fish.

"I can pull through anything!" said the big magnet.
"Try a hat," said the cat.

"I can pull through anything!" said the big magnet.
"Try a towel," said the owl.

"I can pull through anything!" said the big magnet.
"Try a chair," said the bear.

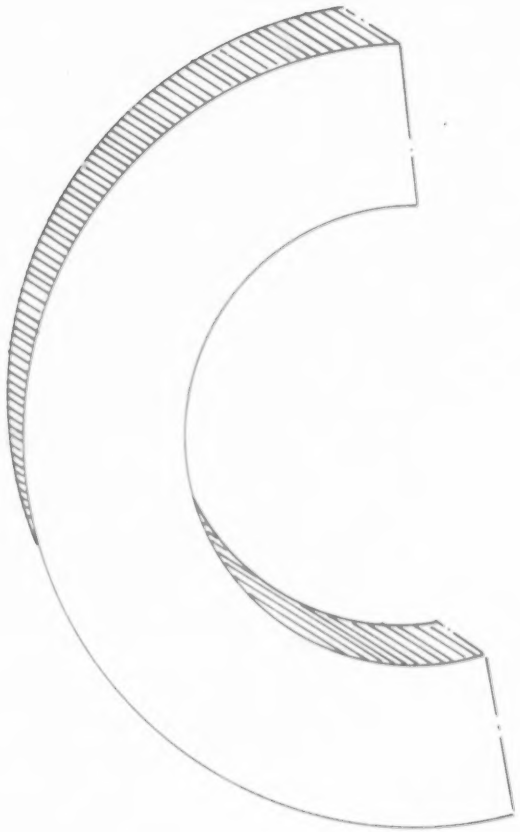
"Oh-oh! I can't pull through a chair.
I guess I can't pull through EVERYTHING."

The Very Strong Magnet

Based on the original: The Very Hungry Caterpillar
Eric Carle
Scholastic Book Services,

Adapted by Wendy Stephenson

On a dark shelf, at the back of a closet, a very strong magnet lay in a box.
One dull and rainy morning, a little boy reached up and opened the box. He took the magnet out. He started to pick things up with his magnet.
On Monday he picked up a pin.
On Tuesday he picked up a tack.
On Wednesday he picked up a clip.
On Thursday he picked up a needle.
On Friday he picked up a nail.
On Saturday he picked up a key.
On Sunday the little boy dropped the magnet!
The key fell off.
The nail fell off.
The needle fell off.
The clip fell off.
The tack fell off.
The pin fell off.
The little boy took the magnet and put it back in the box. Then he put the box on the dark shelf at the back of the closet.



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U-magnet

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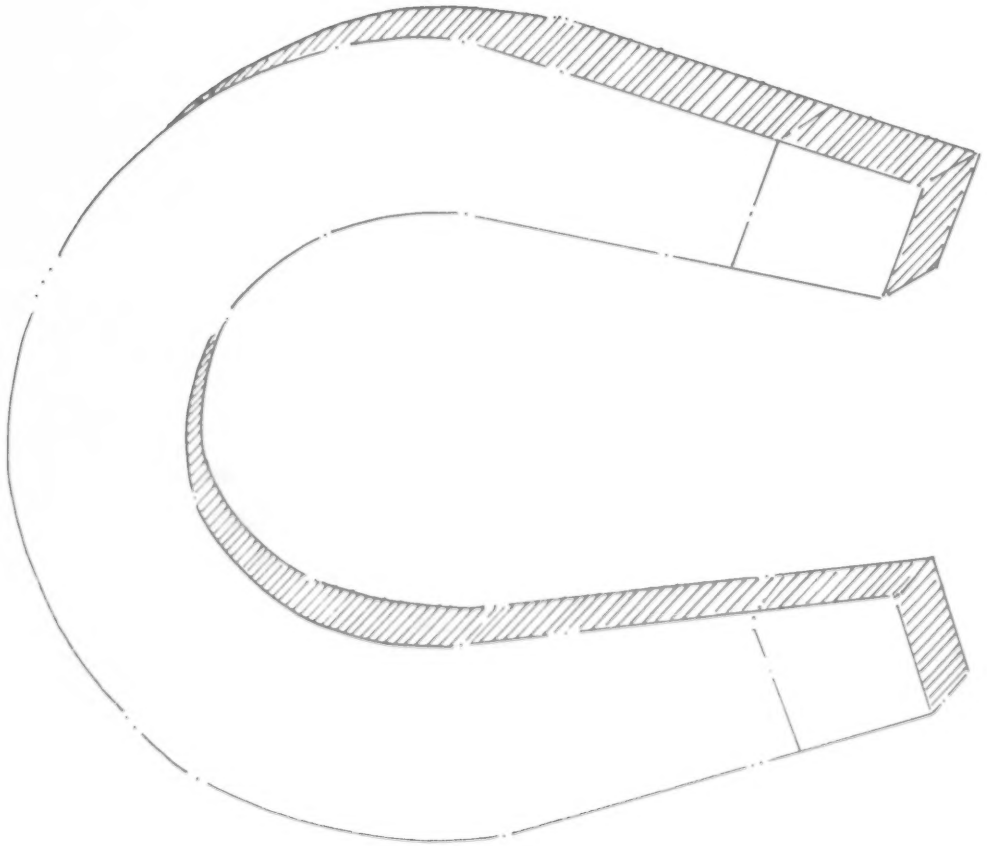

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Horseshoe magnet

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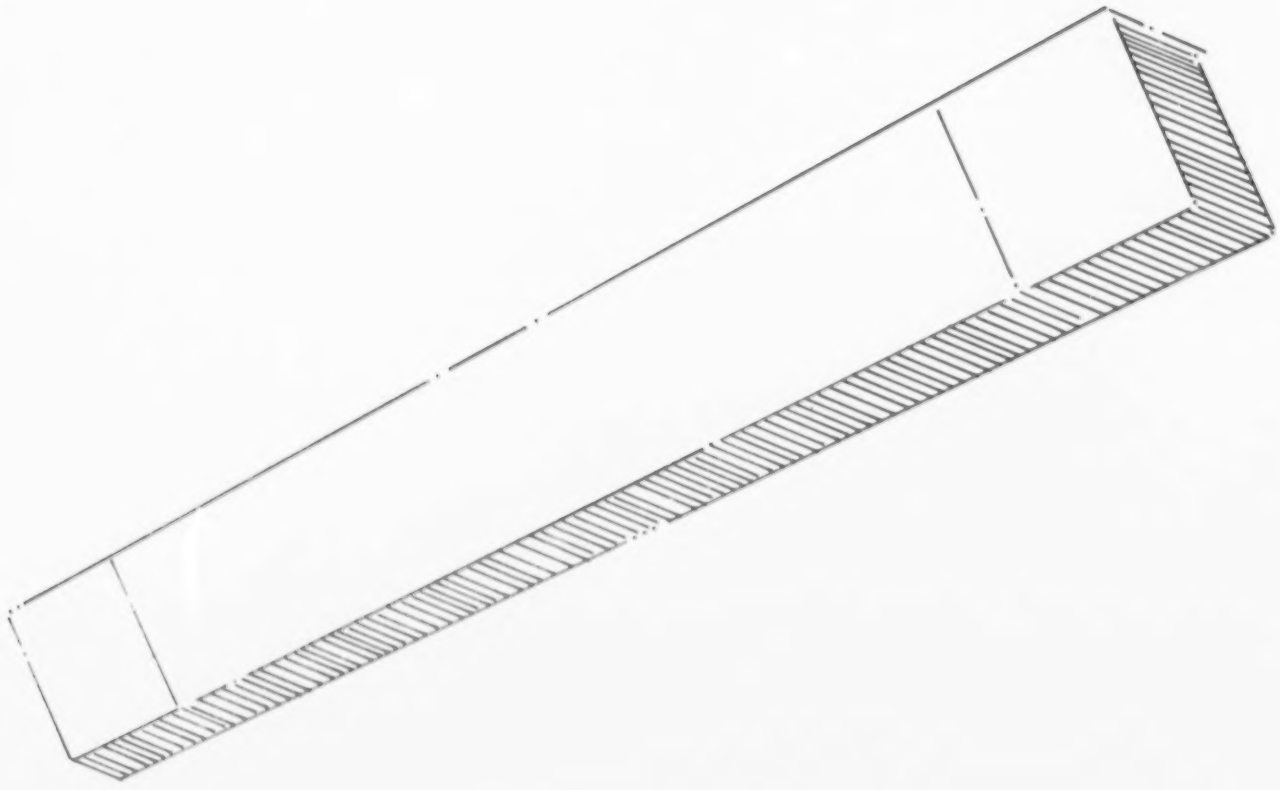

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Bar magnet
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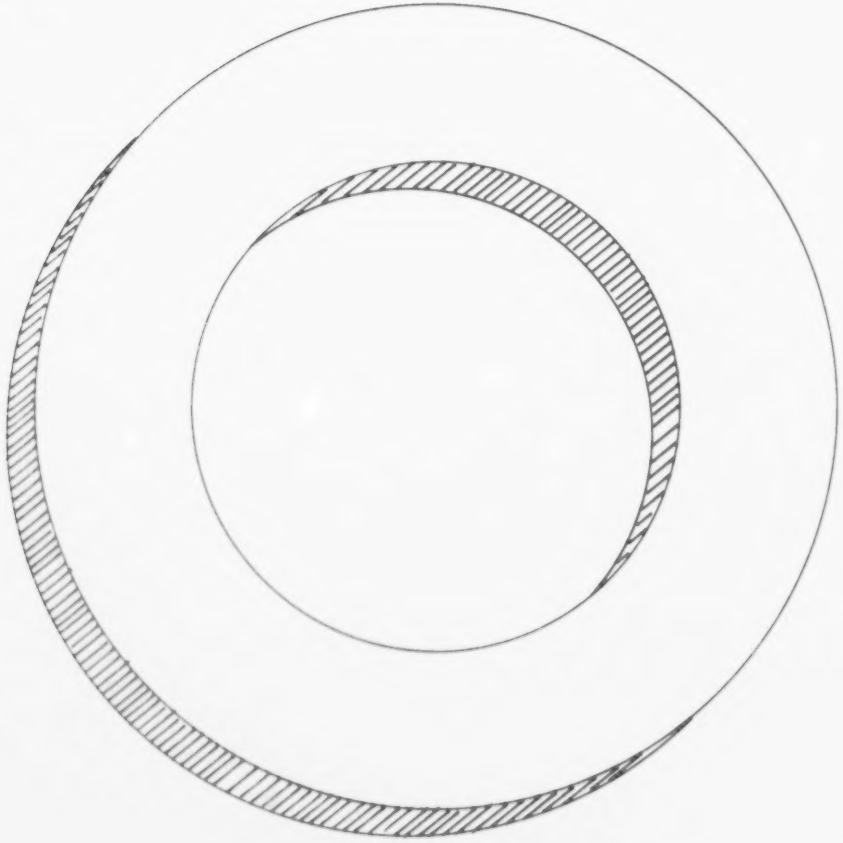
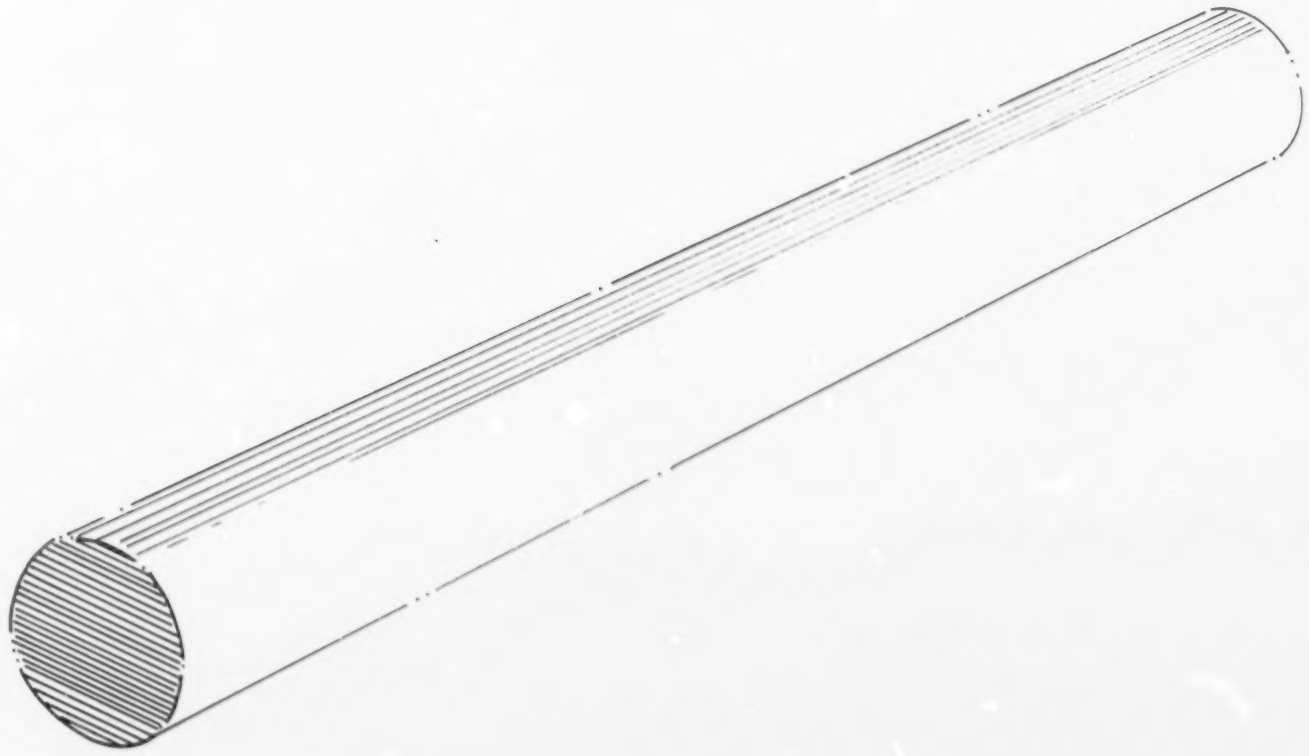


Ring magnet



Rod-shaped (cylindrical) magnet

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Disc magnet

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Northwest
Territories Education